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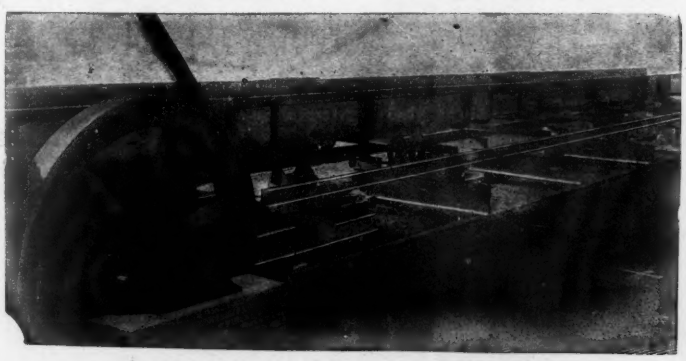

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# JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

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## EDITORIAL NOTES—GAS, &c.

### Position of the Livesey Memorial Fund.

THE period within which the Livesey Memorial Fund Committee asked—mistakenly we felt at the time—that contributions should be forwarded, has expired; but, of course, the fund is not closed, and ought not to be until the goal has been reached. At this stage, however—more than a month after the circulation of the invitation to subscribe—some disappointment must be expressed at the sluggish way in which gas companies and municipal gas committees are responding. Up to the present, the greater proportion (in numbers) of the subscriptions has been not from gas undertakings but from individuals. It is not too much to ask that all who are members of the profession to which Sir George Livesey belonged should remind the Boards and Committees with which they are associated of the project, and influence their contributions. A greater display of spontaneity in this matter had been looked for. Certainly, the position of the fund to-day does not by any means evince that "active support" which everyone who voted for the first resolution at the meeting on Dec. 10 last promised to give the movement then initiated for perpetuating the memory of one who was himself both an active and a strenuous worker.

Is there anything standing in the way of the faster accumulation of the fund, and is there anything that can be done to quicken the inflow? We think both questions may be answered in the affirmative. There have been suggestions that the form of the circular, its distribution, the means taken to make the fund public, and so forth, were not the best possible in the interests of the movement. Whatever may be our personal opinions on these points, they are trivialities compared with the great purpose of perpetuating the memory of one who rendered life long and distinguished service to the whole gas industry. Whatever the form of the invitation, whatever was done in the way of its circulation, it should be sufficient to know that the fund is open, to cause all who admire the work of Sir George to make it a personal matter to ensure its success. Such paltry points, however, are not the ones that are causing certain gas administrations, and influential ones too, to withhold contribution. From more than one quarter has come the question, What are the London and some of the more important Suburban Companies doing in this matter? It is the lead of these Companies that was required at the outset; and it is their intervention by subscription now that would, it is believed, give the required impulse to the flow of contributions. It is feared, however, that for the moment something in the nature of an *impasse* exists, which, it is earnestly hoped, in the cause of the fund and its object, will be speedily removed.

The letter that was published in the "JOURNAL" last week from Mr. Charles Carpenter (p. 226) appears, in an indirect way, to confirm a rumour that the South Metropolitan Gas Company are confining themselves to the private memorial to Sir George at the Old Kent Road, and are not, in their corporate capacity, contributing to the fund for the memorial by the industry generally. It will be remembered that, but a short while since, at the instance of Sir George, certain undertakings agreed to annually subscribe towards the support of the Leeds professorship. Among others, the South Metropolitan Gas Company and the Gaslight and Coke Company willingly covenanted to contribute £100 a year each. On the occasion of the memorial fund meeting, Mr. Corbet Woodall made this statement: "If the professorship project was adopted, then there would "be no longer any necessity for the payment of the annual "subscriptions; and though he had no authority to speak "for others, he felt no doubt that those who had contributed "so far an annual sum, would commute it for a certain "number of years' purchase. At any rate, he could answer "for it that the Gaslight and Coke Company would do so "*in the event of this being the system adopted by the other* "*contributors*." The stipulation is italicized because in that and in the suggested confinement of the South Metropolitan Company to the private memorial may be traced the cause of what we deeply hope will only be the temporary absence of the names of the Metropolitan Companies from the larger fund. The cost of the memorial to Sir George that is to be set up in the garden plot adjoining the offices of the South Metropolitan Company is, as Mr. Carpenter says in his letter, "being borne wholly by the "shareholders, officers, and workmen of the Company." The memorial is, therefore, purely a private one, to be erected by personal subscriptions on private ground, and as such is not being provided by the Company in corporate capacity. It has been mentioned that the Company have, in latter years, been contributing £100 per annum towards the support of the Leeds professorship; but there is no knowledge as to the intentions of the Board with regard to continuance or otherwise. It is, however, sincerely hoped they have not come to any irrevocable decision that will, through abstention from corporate participation, have any large, detrimental influence upon the fund. The qualification deliberately made by Mr. Corbet Woodall at the meeting on Dec. 10 is apparently one which he and his colleagues of the Gaslight and Coke Company cannot withdraw; so that, if it be at all possible, the sooner any obstacle that may exist is removed, the better. While there is this abstention from the fund of the London Companies, others also hold back.

"What we did not do when Sir George was alive, we can "do with good grace now" were words used by Mr. Carpenter on Dec. 10. Let it be so on the part of all concerned. For it is anything but a dignified position to see subscriptions to the fund dribbling in, with stagnation threatening but a little ahead, and the total subscription to a required £10,000 merely (to date) under £2800. It must not go down to future generations that anyone in a position to help this memorial fund to complete success failed, though opportunity was his, to lift his hand or exercise his influence to that end.

### Success under Adverse Conditions.

A VARIETY of complexion has, in the past few years, been spread over the meetings of the Gaslight and Coke Company. There were the dolorous proceedings (succeeding the days when criticism enlivened) of the period when the affairs of the concern, save for the changes occasioned by markets and by atmospherical conditions, became almost stereotyped, and proprietors dropped into listless demeanour and did not expect anything more for themselves or for the consumers than had grown to be customary. Since then—after a spurt of interest through the bursting out of a condition of things that was within a stretch of years without precedent—a continued tale of success, succeeding a change of policy, has thrown such contentment over the body of stockholders that again the proceedings at the meetings have, on their side of the table, been of somewhat humdrum character. Something is clearly wanted to put life into the proprietors' interest, in order to give some indication that they do understand and, understanding, appreciate all that has been done, and all that is being done, to lift the concern into the position that of right—both in respect of seniority and magnitude—it should occupy. Nothing, we are sure, would give the Governor (Mr. Corbet Woodall) and his fellow-Directors greater pleasure than to see at the meetings the indications of a live interest on the part of the proprietors in the affairs of the undertaking.

In the report to be presented to the proprietors next Friday, the Directors have furnished materials that should act as incitants to interest. The Board have converted the Company into a co-partnership one; and now proprietors, consumers, and workers who contribute by capital, by

custom, or by labour to the prosperity of the undertaking, will all share in the successes of the concern, and all forfeit a little should stress of circumstances compel. In so introducing a new element into the constitution of the Company, the Directors have at one stroke, following the example of Sir George Livesey and the South Metropolitan Company, brought into being a co-partnership concern that is unrivalled in the magnitude of profiting numbers. The act, too, places the gas workers throughout the Metropolitan Gas-Works on an equality. Yet another matter that should awaken interest is the Bill that has been introduced into Parliament to authorize amalgamation with the West Ham Gas Company. The Gaslight and Coke Company have plenty of the classes of custom that are obtained in the residential, hotel, club, and shopping West, in the commercial City centre, and in middle-class areas in other directions; and the concern can well do with a little more of the industrial custom such as is to be found in the West Ham district, while the West Ham district (which must suffer when there is industrial depression) can well do with more of the balancing advantages of the larger classes of custom obtaining in the Gaslight and Coke Company's area. More and more the value to an undertaking of diversity in character of supply is being appreciated. In the same Bill, the proprietors will find another scheme whereby the Board are proposing to effect uniformity in the conditions affecting Metropolitan gas supply, and that is in reducing the standard illuminating power of the gas to 14 candles.

In considering the present accounts and making comparison with the second half of 1907, the fact that the price of gas was 1d. lower (representing a concession to the consumers of about £40,000 in a half year) must be borne in mind. Remembering this, as well as the decline in the market value of coke in sympathy with the recession of coal values and the depression of trade, there must be gratification in finding that, after meeting fixed charges and setting aside £10,000 for the redemption fund, the ordinary dividend (requiring £343,661) has been earned; and there is a balance of £11,026 to add to the undivided profits brought into the half year—thus leaving in hand £423,324. This is an extraordinarily sound position with which to close the year 1908, in view of the conditions affecting sales and financial results, and which conditions are worth noting: A good spell of summer weather, and mild and open weather during the closing weeks of the year, indifferent trade conditions have persisted, residuals have followed the general decline, the gas consumers (through the 1d. reduction in January) took about £80,000 over the year from the revenue, and the proprietors are sharing over the whole year £4 10s. 8d. per cent. instead of £4 8s., which increase represents £19,315. Towards these sums, the re-established meter-rents have contributed less than £58,000. The drawbacks, the relinquished revenue, the increased dividend distribution, together make a considerable representation against the Company. But, nevertheless, the undivided balance at the close of the year is greater. In view of this, the Directors have reduced the price of gas by a further penny; so that now the consumers, through the reduction of 2d. in twelve months are benefiting to the extent of £160,000 a year, less the £58,000 reimposed by way of meter-rents.

The slightly easier conditions of the market for raw materials last contract season induces one to specially turn to see the effect on the half-year's accounts. An expenditure of £561,954 for coal in the half year represents, contrasted with the corresponding half of 1907, a reduction in outlay under this head of £30,102; but it is also seen that the amount carbonized—813,207 tons—was 15,479 tons less. The abatement in price has not, therefore, been considerable, nor equivalent to what the industrial and commercial conditions of the country gave ground to expect. On the other hand, the amount spent for oil (£83,879) for the manufacture of carburetted water gas was more by £3126. The consumption of oil in the half year (7,308,936 gallons) represented an increase of 57,894 gallons; but, to set against this, a consumption of 36,215 gallons of spirit represented a decrease of 19,195 gallons. The amount spent for coke and breeze for carburetted water gas manufacture (£33,758) was less by £3389. Therefore, the decrease in the cost of raw materials for gas manufacture, taking them together, was £30,365. Naturally, one looks, with a falling market for fuel and depression in trade, to a lapse of residual products from former levels; and the half-year's trading outcome shows that the decline in revenue from residuals has overshot the saving of £30,365 on raw materials by £13,192—that is to say, the residuals in the aggregate returned £43,557 less. Coke, of course, is the main contributor to the decrease; for the income from this quarter (£258,863) has fallen by £36,601. The balance of the decrease on residuals—in all about £7000—is spread over breeze, tar and tar products, and ammoniacal liquor and sulphate of ammonia. But this is not worse, but rather better, than the anticipation justified by the ruling conditions.

The receipts for gas for private and public supplies amounted to £1,493,253, which is a decline of £44,105. But the meteorological and trade conditions of the year caused the consumption to stand practically still; so that, from sales alone, there was no open road for hope that the £40,000 or thereabouts representing the reduction for the half year of 1d. per 1000 cubic feet would be compensated. As a matter of fact, there was a diminution in consumption of 21,880,000 cubic feet. But 22 million cubic feet with this Company merely represents the difference between an average day's consumption and that of a day propitious for big use. For example, last Wednesday—densely foggy, cold, and cheerless in London—115 million cubic feet of gas were distributed by the Company, compared with an average day's output of 95 millions. The six months, however, have seen an excellent increment in the connections. No less than 15,641 new consumers have been booked—making 25,972 additions for the year. The number of stoves sold and let on hire in the half year was 21,723; making the total for the year 34,884. The consumers connected in the half year numbered 905 more than in the corresponding half of 1907, and the stoves 2646. While dealing with consumption and increased connections, we are reminded of the alarmist newspaper references of six months ago to the item of unaccounted-for gas. For the past half year, there is entered under the heading an increase, in comparison with the corresponding half year, of about 9 millions; but the difference between the present total and that for the June half year is represented by 300 to 400 millions. The June half is the one showing the greater amount of unaccounted-for gas; but the shrinkage to near normal figures on the present occasion for the December half year will probably provide the note for an interesting explanation by the Governor of the abnormal and then somewhat mysterious figures of six months since. The daily press sensation mongers will, in all likelihood, find that there is nothing of a phenomenal character for them to lay hold of; and by now the "Lancet" must have seen that, save for the depressing effects of cloud-covered trade and the increasing financial burdens of the taxpayer, the world wags in as merry mood as ever.

There are a few miscellaneous items in the accounts which call for attention, other than those specially referred to. The capital spent in the half year amounted to £83,003—on buildings and works £12,433 was expended; and on mains and service pipes, and meters and stoves, £70,570. But £46,381 was written off for depreciation; so that the total addition to the capital account was £36,622. This capital expenditure shows plainly the importance of the distribution and sales department in a gas undertaking to-day; and if further evidence were needed, it can be obtained by looking at the disbursements under the head of distribution in the revenue account and the stove and meter rental on the receipts side of the accounts. All these items exhibit an increase. On revenue account, the total expenditure was £1,467,519, which was a decrease of £36,793. The receipts amounted to £2,027,054, being a diminution of £66,672. Deduct from this the £36,793 reduction in expenditure; and it is seen that the balance carried to the net revenue account (£559,534) is only £29,879 less than in the corresponding half of 1907. This is a comparatively small difference, and is wholly traceable to temporary and external conditions.

## An Increased Make Compensates a Decrease in Consumption.

A GOOD account. Looking at the first two lines of the report issued by the Directors of the South Metropolitan Gas Company (from the foot of which the accustomed name has disappeared, and at which that of Mr. Charles Carpenter now stands), a layman might be forgiven if, without leading, he did not at first feel prepared to fully endorse the statement of the Board that the working for the past six months must be regarded as satisfactory, notwithstanding a decrease of 1·7 per cent. in the quantity of gas sold. That 1·7 per

cent. on the large volume of sales of the Company suggests a considerable amount. In the corresponding period, however, there was an increase of 1·36 per cent.; and such rises and falls nowadays are easily traceable by the station meters to climatic conditions. To ascertain the excellencies of the accounts, we have to penetrate farther than the mere statements of the report, which, however, gives an indication where to look for them. "The expenditure on coal," it says, "has been less, mainly by reason of improved working "in the retort-houses, resulting in an increased make of gas "per ton. To the same cause, must be ascribed the greater "yield of coke, though less coal was carbonized in its pro-"duction." The outlay on coal was £383,199, which is a reduction (compared with the corresponding period of 1907) of £50,929; and the lessened consumption of coal was 28,014 tons—the quantity carbonized being 580,775 tons. Calculation can only be made on the bare figures presented in the report; but assuming that the cost was somewhere in the region of 13s. 6d. per ton delivered into store, one may be pardoned for questioning the accuracy of the term "mainly," and giving a fair amount of credit to the reduced cost per ton at which the last contracts were entered into.

But the improved working in the retort-houses has had a very remarkable effect on the accounts. Taking the figures as they stand, the amount of gas made during the half year is seen to have been 6,367,048,000 cubic feet; and this is equivalent, 580,775 tons having been carbonized, to a make per ton of 10,963 cubic feet. In the second half of 1907, the make of gas was 6,506,124,000 cubic feet; and the quantity of coal carbonized was 608,789 tons, so that the make was equivalent to 10,687 cubic feet. Therefore, on these figures, the difference in the yield per ton was 276 cubic feet. If this increased make per ton is spread over the 580,775 tons of coal carbonized, it represents no less a volume of gas than 160,293,900 cubic feet, which, if sold at 2s. 3d. per 1000 cubic feet, would represent a revenue of £18,033. The gas sold for private and public lighting was 6,006,201,000 cubic feet, as compared with 6,113,750,000 cubic feet in the corresponding period of 1907; so that the difference against the past half year was 107,549,000 cubic feet. This quantity, at 2s. 3d. per 1000 cubic feet, would represent a revenue of about £12,099. The difference in the volume of gas between the decreased consumption and the increased make from the coal carbonized is therefore, to the Company's advantage, 52,744,900 cubic feet; and this, taken at 2s. 3d. per 1000 feet, represents in revenue £5934. These figures are not put forward as comprehensive or exact, or as having any value beyond being merely illustrative of the point that the loss of gas consumption is much more than compensated on this occasion by the monetary advantage accruing to the Company by the improvement in the make of gas per ton of coal carbonized. To have produced the 160,293,900 cubic feet representing the total improvement, there would, at the average make of 10,687 cubic feet per ton of the second half of 1907, have been required an additional 15,000 tons of coal. The relation of improved make to decreased consumption (decreased through warm weather and improved means of use) therefore presents us with an interesting monetary consideration.

The greatly decreased expenditure for coal (£50,929) through the larger production of gas and the lower cost per ton, is in excess of the inevitable loss on residuals, owing to diminished fuel values and depression in trade, by some £23,365. That is to say, the loss on residuals is £27,564; the receipts having been £260,478, against £288,042. All things considered—diminished fuel values, mild weather at the end of the year, and bad trade—the decrease of £15,177 in coke is better than the most sanguine could have hoped for. This loss is largely the result of the depressed condition of the cement trade, in which about one-fourth of the Company's coke production was used last year. Breeze, too, produced less by £4340; but a most satisfactory feature is that tar and tar products only exhibit a decline of £316. There is no doubt that the policy of the Company in taking over the manufacture of tar products has for them proved a sound one. Sulphate of ammonia is, next to coke, the largest contributor to the lower revenue from residuals—the income of £54,886 being less by £7730 than in the corresponding half of last year.

On the revenue side of the account, it is observed that the receipts from gas amounted to £666,447; or a decrease of only £3879. This diminution in sales, the report mentions, is due to several causes; chief among them being the mildness of the weather in November and December, the great number of unlet properties in South London, and the economies attainable by the inverted incandescent burner, which have not reached their limit. As a matter of fact, the Company, both in public lighting and among the private consumers, are doing their best to make the economy and efficiency better known. Regarding the unlet properties in South London, there is no doubt that the improved travelling facilities tempt many of the better class householders to go for residence farther afield; but the greater facilities that the extension and linking-up of tramway services are constantly offering must in time have an effect in filling up these properties by—probably not such an affluent class, but still by a good gas-consuming class of householder. While the Company can record a meter connection of 338,359, being an increase of nearly 10,000, and a gas-stove connection at rent of 288,991 (including 23,820 gas-fires), not embracing the privately owned stoves, but representing an increase of 10,303, there is solid testimony to a broadening of their business base. The Company are also keen in the power business; and they report an increasing popularity—a notable installation just completed being at the Shad Thames pumping-station of the London County Council, where gas is supplied to pumping-engines of upwards of 1000-horse power.

Among miscellaneous points in the accounts, it is noticed that only a small addition—£4889—was made to capital account during the half year; and this was for new meters, stoves, &c. In addition to the items of the revenue account already alluded to, the most notable have likewise connection with the distribution department. The costs of repairs and renewals of meters and stoves are up a little; and, as between meters and stoves, they are strikingly on a par—the outlay on account of meters being £32,392, and on account of stoves £32,398. It may be expected, however, that the Chairman, at the meeting to-morrow week, will dilate on the succeeding item: "Repairing and renewals of "gas-fittings, £26,163," compared with only £6197 in the second half of 1907. A large part of this increase, it will in all likelihood be explained, is due to expenditure in defence of the reputation of gas in the district of supply; for the Company have shown an extraordinary activity—extraordinary, but worthy of emulation—in making secure water-slide chandeliers. This work has been going on for some time; but nevertheless 8300 were converted into fixtures, free of cost to the consumers, in the past half year, and conversions are still proceeding at the rate of 1500 per week. These water-slide chandeliers are being ferretted out by a house-to-house visitation by the Company's inspectors. In due season, we may expect that water-slide chandeliers in the Company's district will be as scarce as flat-flame burners are in the public lamps; for out of 23,822 public lamps all save eleven are now incandescents. It is remarked that there is no abatement in the slot-meter robberies. There were 5061 slot meters broken open during the half year, against 4143 in the corresponding period. But while there was this increase of 918, the money stolen was only 10s. 2d. more—viz., £465 12s. 7d.—than in the corresponding period of 1907. The money feloniously appropriated, however, is no measure of the expense to which the Company are put in repairing the mischief that is wrought by the depredators.

To sum up the financial aspect of the trading of the six months. The total expenditure on revenue account was £790,141, or a reduction of £38,490. The income was £995,784, being a reduction of £29,220, of which residuals account for more than £27,000. The diminution in expenditure is greater than the decrease in income by £9270; and therefore by that sum the amount transferred to net revenue account—£205,643—is higher than in the corresponding period of 1907. There can be no two opinions as to our opening description of the accounts being fully supported by close investigation.

## Flame Arcs v. High-Pressure Gas-Lamps.

THE valuable communication by Professor Drehschmidt, of which an abstract translation is concluded elsewhere in our columns to-day, constitutes an effective rejoinder to the arguments advanced a few weeks ago by Dr. L. Bloch, one of the Engineers of the Berlin electricity supply works, in favour of the general adoption of flame arc lamps for the lighting of important thoroughfares and spaces in large towns. Dr. Bloch's contentions command respect, because, as Professor Drehschmidt recognizes, he does not advance

them without having some experimental basis on which to found them. In this he differs from a considerable number of technical *confrères*, who frequently do not hesitate to lend the authority of their names and repute to statements regarding the efficiency of electric lamps which have no foundation in ascertained facts. Instances of this tendency on the part of electricians to uphold untenable claims on behalf of their commodity are quoted by Professor Drehschmidt; and they throw a lurid light on the methods too frequently adopted to push the business of electricity-supply undertakings by the more unscrupulous members of their staffs. Even Dr. Bloch, whom we willingly credit with the desire to be entirely fair, had chanced on experimental conditions for his observations which were highly favourable to the cause of electricity and decidedly unfavourable to gas, for street lighting. Having regard to the somewhat discursive nature of Professor Drehschmidt's rejoinder to Dr. Bloch, and to the difficulty of following arguments based on rates of charge and conditions of supply differing from those which prevail in this country, it may be useful to put as clearly as possible what are the main conclusions to which Professor Drehschmidt's results lead.

The supply of electricity in Berlin is in the hands of a private undertaking, whose concession expires in the year 1915. Having regard to the negotiations which will have to be opened up, with a view either to a renewal of the concession from that year or to the taking over of the electricity works by the Municipality, on terms to be arranged, it must be obvious that the Electric Supply Company would endeavour to push the business of public lighting by every possible expedient. With the object of gaining advertisement, and of increasing the load on the generating plant in the small hours of the morning, the Berlin Electricity Works have agreed to supply current for public lighting at the low price of 1·44d. per unit. For similar reasons, a supply of current is furnished to restaurants and other large consumers, when taken between the hours of ten in the evening and seven in the morning, at the rate of 1·9d. per unit. On the other hand, the charge to private consumers in the ordinary way is 4·8d. per unit. It will thus be seen how much an electricity concern is willing to sacrifice in order to secure the business of public lighting. Probably there is no gas undertaking in the United Kingdom which has even contemplated supplying gas for street lighting at less than one-third of the price charged to private consumers. With the advantage of this enormous rebate in favour of the street lighting authorities, it is almost inconceivable that the electricians are unable to demonstrate that public lighting by means of electricity is not as cheap as public lighting by gas, despite the fact that gas is charged for at ordinary rates. Yet the inconceivable has happened.

Broadly, the conclusion at which Professor Drehschmidt's figures allow us to arrive are, that the latest type of high-pressure inverted gas-lamps as used in Berlin gives an average illumination of 1 lux for a consumption of 0·033 cubic foot of gas per hour per 100 square feet of road surface lighted. Correspondingly, the special flame arc electric lamps, when equipped with the opal globes which are essential if passers-by are not to be blinded by the dazzling glare, consume 0·74 watt per hour for the same average illumination of the street. That is to say, to get equal average illumination of the surface of a thoroughfare, 22½ watts must be expended on flame electric lamps where 1 cubic foot of gas is consumed in high-pressure inverted gas-burners. Parenthetically it may be remarked that, even so, the illumination afforded by gas will be the more uniform of the two. By means of this ratio for the relative consumption of the two lighting agents for equal efficiency of illumination, we may readily compute the price at which electric current must be supplied in order to compete for street lighting on equal terms with gas at any given rate per 1000 cubic feet, Thus, if gas is sold to the local authority for street lighting at (say) 2s. per 1000 cubic feet, current must cost approximately 1d. per unit. But this refers merely to the gas and current consumed; and the auxiliary charges for attendance and renewals put gas in a much more favourable position compared with electricity. In Berlin, the charge for attendance on the flame arc lamps amounts to £14 per lamp per annum, which relatively to the consumption of energy imposes an auxiliary charge on flame arc lighting of 1·1d. for every unit of current consumed by the lamps. The corresponding charges for the compression of the gas (including depreciation charges on the compressing plant), renewals of mantles, and attendance on the high-pressure inverted gas-lamps, amount, according to the experience gained in Berlin, to 6¼d. for every 1000 cubic feet of gas consumed in the lamps. With the extension of the installation, these charges will be reduced; so that it will be fair to take them at 6d. This item must be added to the price at which a gas undertaking is willing to supply gas for public lighting in order to arrive at the total charges for the high-pressure street lighting. Thus, with gas at 2s. per 1000 cubic feet, this addition for auxiliary charges makes the total cost to the local authority 2s. 6d. per 1000 cubic feet of gas consumed. But since 22½ units of electricity must be expended to give the same average illumination of the road surface as is obtainable from 1000 cubic feet of gas, and since the auxiliary charges amount to 1·1d. per unit consumed, it follows that the latter alone amount to more than 2s. Hence, as 2s. 6d. is the total cost for the equivalent service by means of gas, the electricity undertaking must be content to supply 22½ units for a little over 5d. in order to place electricity on an equality with gas as regards cost for public lighting. That is to say, current must be available at ¼d. per unit in order to afford the same illumination, by means of the most modern flame arc lamps, as gas supplied at 2s. per 1000 cubic feet affords by means of high-pressure inverted gas-burners.

The foregoing figures, deduced from the authoritative data of so careful an observer as Professor Drehschmidt, appear to be absolutely conclusive as to the economy of gas for public lighting—be the electrician's competing equipment as up-to-date as possible. In fact, the superiority of gas in respect both of efficiency and economy is so marked that there seems at the present time to be positively no legitimate scope for the use of electric lamps for street lighting. In domestic lighting, also, gas has almost as marked a superiority. Professor Drehschmidt's figures for metallic filament electric glow lamps, as compared with inverted gas-burners at ordinary pressure, show that 1000 cubic feet of gas are equivalent in lighting value to 36½ units of electricity; so that with gas at 2s. 6d. per 1000 cubic feet, current must cost considerably less than 1d. per unit to be as economical. If the cost of renewals of the expensive metallic filament lamps, as compared with mantles, is taken into consideration, gas appears in an even more favourable position relatively to its competitor. Of the alleged hygienic superiority of electric lighting, we had supposed that the last had been heard; but one of Professor Drehschmidt's quotations shows that some electricians still seek to make capital out of it. Fortunately refutation of this perennial fallacy comes opportunely from a fresh source; but we will defer until next week dealing with this aspect of the lighting problem.

## The Attitude of West Ham.

THE prospect seems reasonably clear that there will not be serious local opposition to the Gaslight and Coke Company's Bill for the fusion of the West Ham undertaking with their own, and for conforming the standard illuminating power of the Gaslight Company's supply to that obtaining in the remainder of London and in the West Ham Company's area. The authority principally concerned in the larger question is the West Ham Corporation; and, while they are lodging a petition against the Bill, if we may assume they are guided by their official advisers, they are not taking this step in respect of principle, but simply to endeavour to gain such concession as they think material in the interests of their district. We cannot, and others cannot, but feel that this amalgamation portends the beginning of a larger territorial transformation in the gas supply of London and the suburbs; and therefore the greater may be its importance. However, sufficient for present discussion is the scheme now before us. In it, ironing out certain details, there is little more than a transfer of administration, with the supplement of economy, to the advantage of consumers and district, that the resources of the larger Company can offer. The reports of the official advisers of the West Ham Corporation are convincing as to the shallowness of matters upon which there can be disagreement; and if a conciliatory spirit pervades both sides, compromise should not be a difficult matter. Mr. William Young, the well-known and respected Gas Examiner, believes that, with certain modifications in the local arrangements as to testing, the proposed amalgamation will be beneficial to the gas consumers in the borough. The Borough Engineer reports good relations with the promoting Company, and

that he fails to find that any powers have been exercised by them to which objection can be taken. The Electrical Engineer only fears that the more vigorous gas sales department of the larger Company will intensify the competition that he has to meet; but that is not a sound reason for opposition.

So far all is well. There remains the Borough Treasurer; and his report only treats of side-issues to the main proposition. Regarding the points he raises, it should be clearly understood by the West Ham authorities that, in all but a small part of the area under their jurisdiction, a 14-candle standard for gas rules at the present time; so that, in asking to be empowered to reduce the standard to that obtaining in all other parts of the Metropolitan area, and a considerable portion of the suburbs, the Gaslight Company are not suggesting anything that will affect the position of West Ham. The Borough Treasurer makes a point as to ¾d. or 1d. being regarded, on a reduction of standard illuminating power, as the proper concession from standard price per candle power. It would be more correct to say that it used to be so regarded; but it is not now. The late Sir George Livesey, before a Parliamentary Committee, not many sessions since, stated emphatically that such a concession has been found to be too much in the case of the South Metropolitan Gas Company; and Parliament, in several instances, has not thought fit to, in any way, interfere with standard prices. There is a good deal of illusion respecting this curtailing of the standard price, when it is already a reasonable one, on a reduction of the nominal illuminating power. Illuminating power in the gas itself is not what intelligent consumers require to-day. They want cheap gas of a respectable calorific value; and under the sliding-scale they get, on a reduction of price, something like (in the case of the Gaslight and Coke Company) four-fifths of the total benefit that is distributed between them and the gas proprietors. The reduction in illuminating power is a step in working economy, and in liberty in respect of raw material purchase, to the realization—not immediately perhaps, but as the system of working can be altered—of further price reductions, and the sharing of the benefits. For the West Ham gas consumers, the question raised has, as intimated, very little concern in face of the 14-candle standard now existing there. But it is a consideration for them that, upon amalgamation, they will participate in the advantages that a diversified business with large resources can offer them. Under the new *régime*, the Gaslight and Coke Company have, in their operations and business generally, opened to view a big capacity for yielding economy; and to this is due the much strengthened position of the concern. The consumers of West Ham need not fear any increase in the price of gas, unless unforeseen market conditions arise that would affect all gas undertakings alike. All things considered, there is not any substantial case to be made out of the point raised by the Borough Treasurer as to the standard price in relation to the lower standard illuminating power. There is 1d. to come off the Gaslight Company's present standard; and if there is any further alteration of the standard, it would mean that there would have to be a readjustment of the financial part of the scheme of amalgamation. If, as Mr. Young says and as we think, the scheme is going to be beneficial to the gas consumers of West Ham, the point raised by the Borough Treasurer is not one on which an attempt to wreck the proposal should be made.

The Treasurer raises again the question as to the position of labour in relation to the scheme. The supplying of West Ham with gas will require as much labour under the new administration as under the old; and, what is more, the men will have the privilege of entering into the new co-partnership arrangement. But why all this fuss about labour? The Borough Council themselves—and they count themselves the friends of labour—have been working with considerable energy in trying to supplant the gas business in West Ham by some other form of business that, in proportion, gives far less employment to labour. It is also feared by the Borough Treasurer that there will be a loss of rateable value if the gas-works at West Ham are closed. It so happens that, according to a statement issued by the Gaslight Company, there is no intention of closing the works, but only of taking up the increase of business at the Gaslight Company's neighbouring station. The Borough Treasurer suggests that the assurance might be sealed by a clause in the Bill. This is a matter upon which it is unnecessary to express an opinion here; but the intimation shows the direction in which the wind may blow. The municipal exchequer must not be injured; financial economies and consequent advantages to district and consumers must all be scattered rather than the borough revenue should be in any way affected, though in time the advantages might have a value to the district far exceeding the money represented by the rates. But the question of loss need not alarm the Council; they will find it will prove itself an image created by fear, and not an actuality created by time and changing events. We cannot, however, resist pointing out that the Council have done their best, though they want to retain the revenue from the rates, to depreciate the value of the Gas Company's property by municipal competition. There is one other question on the table; and it is whether or not it is desirable for the Corporation to themselves acquire the West Ham gas undertaking. Now, we would seriously ask the Council, before proceeding in this matter, to pause and consider carefully the handwriting on the wall, or rather on certain coal-bunkers in their neighbourhood. There it is written: "Electricity is now Cheaper than Gas." That legend is the work of a municipal department. Then would the purchase of the gas-works be wise?

## Society of British Gas Industries.

Though, through advancing years, that veteran labourer in the gas industry (Mr. Thomas Newbigging), has abandoned part of his professional work, his interest in all that is passing in the industry is as acute as ever. His contributions (through in recent times the Manchester Institution) to technical gas literature and his addresses during the Manchester Exhibition on current gas topics have shown the unquenchable spirit. It was with gratification that it was heard that the Society of British Gas Industries had induced Mr. Newbigging to accept the Presidency for the coming year; and we know that he appraised the invitation as a great honour. There will be a generous warmth in the greeting that the new President will receive on taking the chair, after the general business is disposed of, at the annual meeting of the Society on Feb. 25, at the Waldorf Hotel, Aldwych. On that occasion Mr. Newbigging will deliver his address; and in the evening there will be the annual dinner of members and friends. It will be remembered that, owing to the death of the late President (Sir George Livesey), this was not held at the customary time.

## Manchester and Liverpool Gas Compared.

In last week's issue, there was reproduced from a Manchester contemporary some statistics comparing the financial position and working of the Manchester and Liverpool gas undertakings. The publication of such statistics in a technical paper does not much matter, as the readers are capable of measuring for themselves the relative value of the figures presented; but without full and proper explanation, and an acknowledgment of authorship, we regard as distinctly unfair the publication of statistics of the kind in the local Press. The figures in this instance were published anonymously by "A Member of the Manchester Gas Committee," and were manifestly intended to show the Manchester undertaking in a better light than that of the neighbouring city. Figures that make a vast difference to several of the items are the 17·53-candle power of Manchester gas and the 20·2-candle power of Liverpool gas. Every reader of the "JOURNAL" knows there is little sympathy shown in these columns with the supply in these days of high illuminating power gas; but the figures of Manchester and Liverpool ought not to have been published without a statement that the means of testing for those illuminating powers make the disparity between the two qualities of gas much greater than the bare figures represent. The 17·53-candle power of Manchester is obtained by testing with a "Metropolitan" No. 2 burner; while the 20·2-candle power of Liverpool is the result of testings by a flat-flame burner. If Manchester gas were tested by a flat-flame burner, it is quite probable the return would not be greater than 13 candles; and 13-candle power is about the figure that should, in strict fairness, be contrasted with the 20·2 candles of Liverpool. When this difference is considered (the difference of about 7 candles on level testing terms), the next three items in the comparative statistics —the cost per 1000 cubic feet, price charged, and gross profit—are all considerably vitiated. As a matter of fact, the average

price charged at Manchester—2s. 3·36d.—is, regarded from the illuminating power basis (which is the one chosen by the compiler of the statistics), much too high compared with the charge of 2s. 6·04d., the average in Liverpool. If the figures were all comparable, on an equality of illuminating power, the Manchester Committeeman would not have been so ready to publish his compilation. The gross profits ought not to be anything like 10·4d. for Manchester candle-power gas in relation to Liverpool candle-power gas; and if the gross profit had not been so high, Manchester would not have been in the position to have caused the gas consumers to bear, in excess of the rates paid by other ratepayers, a burden of £2,858,585 since the acquisition of the works. There is one calculation the Manchester Gas Committee man did not make. If he divides the output of gas by the number of consumers, he will find the average annual sale per consumer in Liverpool is 34,625 cubic feet, against 33,809 feet in Manchester. There is a mistake in one of the lines of the table. "Excess of liabilities over assets" should have read "Excess of assets over liabilities."

## Gas Managers in Conference in Victoria.

In another part of the "JOURNAL" will be found a report of a portion of the proceedings at the third annual meeting of the Victorian Gas Association, which was held at Ballarat on the 4th and 5th of November, under the presidency of Mr. S. E. Figgis, the Manager of the gas-works in that town. The news of the loss sustained by the gas industry by the death of Sir George Livesey had reached the Antipodes before the meeting, and a cablegram conveying an expression of the regret of the members of the Association had been sent. But it was only fitting the matter should be brought forward; and this was done by the President and Mr. R. O. Thompson, an ex-President—an appropriate resolution being passed by a rising vote. The President delivered an address in which he referred to some of the special features of the gas supply of his town; and it was listened to with interest. Mr. J. Lord, of Williamstown, read a paper on "Purification by Oxide," which gave rise to a good discussion. A large portion of the available time at disposal was devoted to a consideration of the subjects deposited in the "Question Box," which were of a varied and most interesting character. This portion of the report we are compelled to hold over till next week. In the ordinary course, Mr. Figgis would have been succeeded by Mr. T. Lord, of Geelong; but as this would have involved a second meeting in the country, and the Council deemed it advisable to meet alternate years in Melbourne, Mr. Lord expressed his willingness to concur in the arrangement, and retire in favour of the Council's nominee—Mr. Philip C. Holmes Hunt, the Engineer of the Metropolitan Gas Company, and Hon. Secretary and Treasurer of the Association. The meeting entirely approved of the change; and Mr. C. W. Howlett was chosen to discharge the secretarial duties. The members were hospitably entertained by the Directors of the Ballarat Gas Company, whose works were inspected, under the guidance of Mr. Figgis, as well as the extensive reservoirs of the Ballarat Water Commission, particulars of which were furnished by Mr. A. Fraser, the Secretary.

## Socialist-Labour Policy.

The conference of the Labour Party at Portsmouth has not revealed the mouthpieces and leading representatives of organized labour in any new light. There has been what Mr. Bernard Shaw has described as the usual string of absurd resolutions, and no evidence of a new spirit or of an awakening to sound doctrine. The strident notes of Socialism have been heard above the more agreeable tones of the old Trade Unionism; but it is pleasing to see (though probably the respite is but temporary) that the conference did not, through the absence of a representative of the Union that had given notice of a resolution, declare that the party should henceforth sail openly under the Red Flag. However, several of those present at the conference, after the manner of the delegates at the Trades Union Congress, roundly abused all who are not of their way of thinking, and showed, by majorities in the voting, that they are generally at war with society and with the capital that makes industrial operations possible. Once more the communistic doctrine was subscribed to, that there must be socialization of the means of production, distribution, and exchange, controlled by a democratic State in the interests of the entire community, with complete emancipation of labour from the domination of capital and landlordism. The bomb that was recently thrown into the party camp, by the declaration of the illegality of the compulsory levy upon trade unionists for the purpose of labour party representation in Parliament, was brought before the conference. But this is a matter that is going to be contested before the highest tribunal; and afterwards, if appeal is not successful, a demand is to be made upon Parliament to pass a Bill legalizing the levy. The representatives of organized labour in Parliament have to comply with the behests of those sending them there. They are not in any sense free agents; and their payment is, as has been pointed out, equivalent to the purchase of votes in Parliament for a class. If this sort of thing is legalized, there is no reason why other interests should not have their paid representatives. These members do not represent their constituencies, but merely a section. It all amounts to an abasement of human liberty; and so far is this carried that certain of the Socialists at the conference desired (but were unsuccessful) to extract a pledge that no member of the party should appear in support of a measure upon the same platform as members of the "capitalist political parties." And socialism is supposed to stand for freedom! Complaint was made that last year there was a heavy decrease in the amount paid in wages as compared with 1901; while the amount paid in income-tax largely increased. Industrial depression is no doubt the cause of the former; and equally it should be the cause of a curtailment of income. Perhaps, however, the Income-Tax Commissioners could point out to those who complain the real cause of the increased amount upon which tax was paid last year. There was also complaint as to the increase in the cost of living—of increase in rent and in the necessaries of life, such as coal. If the Socialists will support legislation that produces increases of the kind, they must, like those people have to who do not support it, bear the effects with the best grace at their command. There was intimation that the Right to Work Bill is to be reintroduced; and the members left the conference with a serious determination to enhance their endeavours to reorganize the industrial system on the basis of production for use and not for profit. It may be suggested that there is in the trading undertakings of local authorities the material already in existence for a start. If no profit were made from them for the relief of the rates of the capitalist and landlord classes, the working class would benefit in the cheaper product—town gas, for example—and lower tram fares. We commend the point to Labour members in the House and in all local bodies.

## Supply by a Consumer to His Tenants.

Last year there was considerable complaint regarding the amount of profit that the Franco-British authorities put upon the gas and electricity sold by them to the exhibitors. Of course, the exhibition authorities took both gas and electricity in bulk, and the statutory supply authorities were fully alive to the fact that it was the intention to do business direct with the exhibitors. But it is quite clear that, if the supply authorities chose, they could protect the exhibitors from extortionate charges by declining to allow the exhibition authorities to retail gas in the areas of supply. The matter has come up in connection with the Empire Palace at Ealing. The Corporation supplied electricity to the Hippodrome and its appurtenances under contract. Messrs. Lipton became the occupiers of a certain part of the premises; and the Hippodrome authorities supplied them with electricity. The Ealing Corporation objected; and it was decided to let the law settle the matter. The local Justices found that there had been a technical offence, under the Gas-Works Clauses Act, 1847, and ordered the defendants to pay the costs. An appeal was lodged in the High Court; and the Lord Chief Justice and Justices Bigham and Walton heard the arguments. The appeal was dismissed; the Court holding that the appellants were not entitled to have electricity supplied for any purpose they liked, but only for the purposes mentioned in the agreement. The decision is an interesting one.

## More Information Before Investment.

Adorned with the coat of arms of Buckingham, an invitation has been circulated for applications for £3500 of 6 per cent. preference stock and £2000 of first 5 per cent. debentures (redeemable at a premium of 7½ per cent.) in the Bucks. and Oxon. District Gas and Coke Company, Limited. This is a new concern having for its nucleus the property of the old Buckingham Gaslight and

Coke Company, Limited. In a modest way, within the narrow limits of their operations, the old Company did not do badly, paying 4½ per cent. on loan capital and 5 per cent. on shares, though the price of gas (the consumption then being only about 7 millions) was high. Six per cent. for preference stock and 5 per cent. for debentures looks attractive enough; but more news will be needed by careful investors before entrusting their money into the keeping of the new Company. The money is required *for part payment* of the purchase money for the works at Buckingham, and also for the purchase of works at Woodford, situated on the Great Central Railway. The now common ruse to attract subscriptions of capital is seen in the guarantee of the interest on the preference stock for two years from September last. Purchasers are also offered a full six months' interest on the preference stock on March 25 next. The sparse information in the invitation for applications for the stock and debentures is a sufficient reason for making more particular inquiry into the concern, its commitments, and its prospects. The fact that applications are to be addressed to a Bicester Solicitor is not sufficient to satisfy personal interest when investing money. In size and style, in offering as a bait the payment of a period's unearned interest, and in having the applications addressed to Solicitors, the present invitation circular bears an unmistakable family resemblance to that lately issued by the North Oxfordshire Water Company, Limited.

## Gas Consumptions during Fog.

There was a heavy pull on the gasholders and producing plant at most gas-works in the areas that were densely fog-bound on Wednesday and Thursday last. But they were not record days for consumption. Records are more frequently made on dark, cold days in the busiest shopping season. The consumption in the case of the Gaslight and Coke Company rose considerably on the two days; but it is interesting to observe how uniform are their returns for Monday, Tuesday, and Friday—before and after the fogs. The consumptions day by day from Monday to Friday were: Monday, 97 millions; Tuesday, 96 millions; Wednesday, 115 millions; Thursday, nearly 120 millions; Friday, 98 millions. In the case of the South Metropolitan Gas Company, they have only had one higher figure for a January day's consumption than was experienced during the fogs of last week; so that their output was also considerable. The outputs of gas on Wednesday and Thursday last from the Commercial Gas Company's works were: Wednesday, 14,652,000 cubic feet, and Thursday, 14,519,000 cubic feet. These were heavy increases as compared with the same dates last year, representing rather over 16 per cent. Date for date, they are records as compared with former years.

## English and German Industrial Companies.

Though he provided a great deal for them to earnestly ponder over, Company Secretaries must have found, at the same time, a considerable amount of satisfaction in listening to an address on "English Joint-Stock Companies" which Mr. W. R. Lawson some days ago delivered at a meeting of the Chartered Institute of Secretaries. That a restoration of confidence in our industrial finance is needed, he showed clearly; but he remarked that "it is consoling for unfortunate shareholders in joint-stock companies to know that their secretaries, as a class, are not the weak points in the system—on the contrary, they are among the few strong points." The part in the lecture of most general interest, however, was a comparison between English and German industrial finance, which proved that all the advantage in this matter rests with Germany. In the half-dozen years ending 1906, it seems, the industrial capital of Germany in shares and debentures has been reinforced to the extent of no less than £239,000,000, or at the rate of £40,000,000 per annum; while for the two years 1906 and 1907, the new industrial issues of the United Kingdom averaged only £23,000,000 per annum. We cannot here go fully into Mr. Lawson's arguments. But his suggestions as to some of the many possible causes of German progress and English retrogression in industrial finance are well worthy of universal attention; for to no one connected with commercial affairs is the joint-stock system an unimportant matter. The suggestions are as follows: (1) The marked superiority of the German joint-stock law to our own. It is a more business-like law to start with, and is much more efficiently administered. (2) The latitude given to dishonest and incapable company promoters in England has produced an excessively large proportion of rotten companies, by which the public have been fleeced and disgusted. (3) The "guinea-pig" and figure-head directors, who were the tools of the company promoter, rendered capable administration and profitable working impossible. (4) Our large joint-stock banks have never systematically and intelligently fostered industrial finance, as the large German banks do, and have always done. (5) Our fiscal policy deliberately shackles home industry, and gives its foreign competitors, not only a free hand, but positive advantages in the struggle. (6) The financial, technical, and commercial branches of German industry being all in charge of trained experts, the results, as a rule, are more satisfactory than those of corresponding English undertakings. Dividends are larger, and market values higher. (7) Capital for new industrial enterprises is consequently easier to raise in Germany than in England. The German public have had altogether a happier experience of them than we have had here. They still believe in them, while the average English investor is sorry that he ever had anything to do with them.

## Vertical Retorts in North America.

According to a paragraph in a recent number of the "American Gaslight Journal," a bench of vertical retorts, erected by the Laclede-Christy Company, of St. Louis (Mo.), "from American designs, out of American material, and of American construction," is now working satisfactorily in America. Our contemporary will not divulge the name of the place; leaving this to be done by the above-named Company. It is stated, however, that the bench has been in operation for rather more than two months, and that the retorts are burning off 1500 lbs. of washed pea coal, which contains at least 10 per cent. of moisture. The coke made is very dense, and of a silver-grey appearance, very much resembling oven coke. There is practically no difficulty with the charge dropping from the retorts; it being very seldom the case that any part of it hangs up. The bench is heated not only very evenly from front to back, but from bottom to top. Up to the time of writing, the retorts had not developed any signs of failure. The preceding facts were furnished to our contemporary by a member of the staff of the Laclede-Christy Company.

At the meeting of the Institution of Civil Engineers this evening, Professor Bertram Hopkinson will read a paper on "Heat Flow and Temperature Distribution in the Gas-Engine."

Sir Melvill Beachcroft will be proposed as the next Chairman of the London County Council; his selection having been unanimously agreed to at a meeting of the Municipal Reform party last Friday. He was an original member of the Council, representing North Paddington in 1889, was made an Alderman in 1892, was Deputy-Chairman in 1896, and Vice-Chairman in 1897. He was the first Chairman of the Metropolitan Water Board in 1903, was re-elected in 1907, and resigned last May.

We have received the "Local Government Annual and Official Directory" for the present year. This is the eighteenth annual issue of the publication; and many of our readers are familiar with it. The contents are every year corrected officially; and the Editor (Mr. S. Edgecumbe Rogers) endeavours to bring up to the latest date before going to press the varied information furnished. In addition to the directory, particulars will be found in regard to the electric light undertakings in London; and the charges for gas and water are given. The book is published at No. 27A, Farringdon Street, E.C., at the price of 1s. 6d.

At the last annual meeting of the New England Water-Works Association, we learn that a Committee was appointed in order to collect statistics relating to the depth at which water-pipes are now laid, and the resulting experience with freezing. The subject was regarded as important, owing to the possibility that under many conditions pipes are laid at greater depths than are necessary. The information the Committee desire is of two kinds. They want data from as many cities and towns as can be induced to report on the present practice in laying pipes, and on the local conditions, which have an important influence on freezing. It is believed that this information will be generally negative in character as regards freezing, and will prove that pipes will not freeze when laid at certain depths. The other class of information desired is testimony as to experience in actual cases of freezing, with statements of the controlling conditions. The latter include the size of pipe, its depth, the character of the soil, the temperature of the air and water, and the velocity of flow in the pipe at the time of freezing. The Committee realize that the preparation of such a statement by any water-works superintendent will take considerable time; and they have accordingly prepared an elaborate form, which will be of material help in putting the data into the best shape for transmission. These forms can be obtained from the Chairman of the Committee, Mr. E. A. Barbour, 1120 Tremont Building, Boston, Mass.

## THE LIVESEY MEMORIAL FUND.

We have received from Mr. Walter T. Dunn the following list of further contributions to the above fund. In forwarding it for publication, he asks us to mention, with reference to the date suggested on the reply-form for use in sending donations, in order to avoid any misunderstanding, that the list will continue open. Mr. Dunn says: "A number of those who, no doubt, intend to subscribe, have not yet replied to the circular; and others cannot do so until meetings have taken place which are to be held during the month of February."

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| Jan. 25 | Amount already acknowledged | 2358 | 18 | 6* |
| ,, 26 | Arundel Gas Company | 2 | 2 | 0 |
| | Calverley and Horsforth District Gas Company | 5 | 5 | 0 |
| | John Holliday, Hull | 5 | 5 | 0 |
| | Joseph Walker, Huddersfield | 0 | 10 | 0 |
| | W. N. Westlake, Exeter | 1 | 1 | 0 |
| | Robert Wyllie, Lower Sydenham | 0 | 10 | 6 |
| ,, 27 | R. Forbes Carpenter | 2 | 2 | 0 |
| | Chester United Gas Company | 10 | 10 | 0 |
| | Fred A. Darlington, London | 1 | 1 | 0 |
| | Devonport Corporation Gas Committee | 1 | 1 | 0 |
| | H. E. Jones, Westminster | 52 | 10 | 0 |
| | Frank H. Jones, Westminster | 5 | 5 | 0 |
| | Lea Bridge District Gas Company | 15 | 15 | 0 |
| | Leamington Priors Gas Company | 10 | 10 | 0 |
| | Maidenhead Gas Company | 10 | 10 | 0 |
| ,, 28 | Charles W. Braine, Wandsworth | 1 | 1 | 0 |
| | Charles Dru Drury, Sunderland | 1 | 1 | 0 |
| | Great Yarmouth Gas Company | 5 | 5 | 0 |
| | Manchester District Institution of Gas Engineers (Lancashire Commercial Section) | 10 | 10 | 0 |
| | Shanklin Gas Company | 2 | 2 | 0 |
| | A. G. Snelgrove, West Ham | 5 | 5 | 0 |
| | Mrs. Andrew Stephenson, London | 1 | 1 | 0 |
| | Frank C. and Frederick W. Taylor, Shanklin | 1 | 1 | 0 |
| | West Ham Gas Company | 105 | 0 | 0 |
| ,, 29 | J. F. Braidwood, Greenwich | 5 | 5 | 0 |
| | Frederick Hazeldine, South Godstone | 2 | 2 | 0 |
| | Mirfield Gas Company | 5 | 5 | 0 |
| | New Inverted Incandescent Gas Lamp Company, Limited | 10 | 10 | 0 |
| | Waltham Abbey and Cheshunt Gas and Coke Company | 5 | 5 | 0 |
| ,, 30 | A. W. Brookes, Secretary, British Gas Company | 1 | 1 | 0 |
| | Thomas Canning, Newport, Mon. | 1 | 1 | 0 |
| | Geo. W. Carpenter, Rotherhithe Gas-Works | 5 | 5 | 0 |
| | Walter T. Dunn, London | 0 | 10 | 6 |
| | W. G. Head, Vauxhall Gas-Works | 1 | 1 | 0 |
| | Heckmondwike Gas Company | 5 | 0 | 0 |
| | Huddersfield Corporation Gas Committee | 10 | 0 | 0 |
| | John T. Lewis, Wellingborough | 2 | 2 | 0 |
| | C. G. Lyon, Knottingley, Yorks. | 1 | 1 | 0 |
| | Stirling Gaslight Company | 3 | 3 | 0 |
| | Tavistock Lighting, Coal, and Coke Company | 1 | 1 | 0 |
| | Westbury Gas and Coke Company, per Mr. N. H. Humphrys | 1 | 1 | 0 |
| Feb. 1 | Barking Gas Company | 5 | 0 | 0 |
| | Cirencester Gas Company | 5 | 5 | 0 |
| | William Edgar, London. | 1 | 1 | 0 |
| | W. D. Hunter, Rotherhithe Gas-Works | 5 | 5 | 0 |
| | Alexander A. Johnston, Brentford | 10 | 10 | 0 |
| | Jabez Light, Kenley | 5 | 5 | 0 |
| | J. W. Napier, Alloa | 2 | 2 | 0 |
| | H. S. Reeson, London | 2 | 2 | 0 |
| | Stretford Gas Company | 21 | 0 | 0 |
| | York United Gaslight Company | 50 | 0 | 0 |
| | Midland Junior Gas Association—First List of Subscriptions | 11 | 7 | 6 |
| | Total | £2794 | 13 | 0 |

* The Maidstone Gas Company's contribution (Jan. 15) was £10 10s., not £10, as stated.

## THE JUNIOR ASSOCIATIONS AND THE LIVESEY MEMORIAL FUND.

After the recent suggestion in our editorial columns that the juniors of the gas profession might desire to take part in the Livesey Memorial Fund—and there is a particular appropriateness in them doing so, seeing that the work which the fund will make possible will apply to the future—it is with considerable gratification that we have received from the Secretary of the Midland Junior Association (Mr. Harold E. Temple) a cheque for £11 7s. 6d., which represents the total of the first contributions from the members of that body. The cheque has been forwarded to Mr. Walter T. Dunn, as Secretary to the Fund; and here we are pleased to put on permanent record the association with the fund of every contributor to the amount of the cheque.

Midland Junior Association—

First List of Subscribers.

| | £ | s. | d. |
|---|---|---|---|
| Mr. James Hewett (*President*) | 1 | 1 | 0 |
| ,, A. O. Jones (*Vice-President*) | 1 | 0 | 0 |
| ,, R. S. Ramsden (*Junior Vice-President*) | 0 | 10 | 6 |
| ,, Harold E. Temple (*Secretary*) | 0 | 10 | 6 |
| ,, Hy. Burgess. | 0 | 5 | 0 |
| ,, W. E. Caton | 0 | 10 | 6 |
| ,, W. H. Cattell | 0 | 2 | 6 |
| ,, A. N. J. Comely | 0 | 2 | 6 |
| ,, Douglas Cooke | 0 | 10 | 6 |
| ,, J. W. Cooke. | 0 | 10 | 0 |
| ,, A. H. Cranmer | 0 | 10 | 0 |
| ,, W. B. Davidson | 1 | 1 | 0 |
| ,, A. W. Elliott | 0 | 5 | 0 |
| ,, E. Foster. | 0 | 5 | 0 |
| ,, S. G. Geans. | 0 | 2 | 6 |
| ,, A. Hancox | 0 | 2 | 6 |
| ,, A. Hill | 0 | 2 | 6 |
| ,, G. E. Holmes | 0 | 2 | 6 |
| ,, F. O. Jenkins | 0 | 5 | 0 |
| ,, H. Jones. | 0 | 2 | 6 |
| ,, A. Kendrick. | 0 | 2 | 6 |
| ,, H. Mawdsley | 0 | 2 | 6 |
| ,, R. Meiklejohn | 0 | 10 | 6 |
| ,, A. J. Meredith | 0 | 2 | 6 |
| ,, J. H. Morris | 0 | 2 | 6 |
| ,, W. J. Pickering | 0 | 2 | 6 |
| ,, T. H. Poulson | 0 | 5 | 0 |
| ,, Harry Punnett | 0 | 5 | 0 |
| ,, R. J. Rogers | 0 | 10 | 6 |
| ,, A. W. Smith | 0 | 2 | 6 |
| ,, P. Tew | 0 | 5 | 0 |
| ,, C. F. Tooby. | 0 | 2 | 6 |
| ,, G. Twigg. | 0 | 5 | 0 |
| ,, S. Williams | 0 | 2 | 6 |
| ,, E. H. Wright | 0 | 5 | 0 |
| | £11 | 7 | 6 |

The Yorkshire and Southern Junior Associations are also starting funds. In respect of these, we should like to say that, if there is any wish that the individual subscriptions shall not be published, there is no reason why the names of the contributors should not appear, so as to permanently attach to the fund their participation in its formation. Lists sent to us in this way, mentioning the total of the contributions, shall be published.

Anyone occupying any junior position in the gas industry though not a member of a Junior Gas Association can send to our care any contribution however small, and it will receive the same acknowledgment as the contribution of the most affluent subscriber. Let it be clearly understood, however, that we are not appealing for contributions from the juniors, but are merely desirous of giving an opportunity to those who do not (though they would like to contribute) care to send a modest contribution to the larger fund.

## Further Extension of High-Pressure Gas-Mains in the City.

As foreshadowed in our previous issues, a further extension of the Fleet Street high-pressure gas-main is in contemplation. It is now proposed, in view of the demand that has come in from the printing houses there, to run a 3-inch steel tube through Shoe Lane, teeing off the 6-inch main in Fleet Street. During the last week the Fleet Street main has also been joined to the existing high-pressure main in Ludgate Circus; and the high-pressure 10 feet single burner gas-lamps there formerly on the 10-inch pressure trunk main are now connected direct on to the 65-inch compressing plant—the lamps having been spaced out to the corners of New Bridge Street, Farringdon Street, and St. Bride Street. It is proposed shortly to substitute inverted lamps for the present upright burners; it having been shown by experience that foot for foot of gas the inverted burner gives far and away a higher efficiency. It may be interesting to note that the new inverted lamps in Fleet Street are now being lighted by a special pneumatic torch with methylated spirit spray actuated by a hand-bulb at the foot of the lighter's torch; the lighted methylated spray being injected through the air-holes of the lanterns on to the burner-nipple, thus preventing the use of the tower ladder on the footpath should a bye-pass happen to blow out.

# OBITUARY.

## JOHN CLARK.

It is with great regret that we record the death, in his 68th year, of Mr. John Clark, the well-known Engineer and General Manager of the West Ham Gas Company. The sad event, which occurred yesterday morning, was very sudden, as Mr. Clark was out and about as recently as last Wednesday. In fact, one day during the week he was engaged in making an inspection of the gas-works in company with Mr. Corbet Woodall and Mr. D. Milne Watson, the General Manager of the Gaslight and Coke Company, in connection with the amalgamation scheme which is the subject of a Bill to come before the next session of Parliament.

Mr. Clark was the son of Mr. Joseph Clark; and his earlier years were spent in the service of the Imperial Gas Company. After the amalgamation of that undertaking with the Gaslight and Coke Company in 1876, he retained his position until 1884, when he retired. On the death of Mr. E. H. Thorman, the Engineer of the West Ham Gas Company, in 1891, he was succeeded by his son Mr. John Thorman—Mr. Clark becoming Consulting Engineer. Then on the death of Mr. John Thorman in 1895, Mr. Clark took the position of Engineer and Manager; and all that he has done for the Company is now matter of history.

Deceased was of a reserved disposition, and was not, save by name, well known among his professional brethren. He did not identify himself with the work of the technical organizations of the gas industry; but those who knew him well recognized that he did great work within the limits of the undertaking which he so successfully managed. He was most thorough in everything he did in connection with the Company; and in all circumstances he was a genial and plain-spoken man.

In 1902, the West Ham Gas Company secured a Bill which greatly widened the scope of their operations; and in the initiation of this measure Mr. Clark took a prominent part. Whatever the future of the Company may be, what he then did will always mark a new era in the fortunes of the undertaking. During the consideration of the Bill, he was in constant attendance at the Committee Rooms, and took a lively interest in all the details laid before the Committee. It may be remarked, in connection with the proposed amalgamation with the Gaslight and Coke Company, that it was arranged he should continue in the management of the West Ham works for a few years, or at any rate as long as he wished. Deceased leaves a wife to mourn her loss, but there are no children.

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The death has lately occurred at Oakhill Hall, Stoke-on-Trent, at the age of 68, of Mr. Frederick Hurd, the pioneer of the electrical coal-cutting machine, and of the compound silent gas-engine. One of his best-known inventions—the Hurd bar coal-cutter—is in use in several modern collieries, both at home and abroad. Mr. Hurd also designed many huge cranes and refuse destructors.

The death occurred on the 21st ult., at Madeira, of Mr. Arthur Wilson Fox, the Comptroller-General of the Commercial, Labour, and Statistical Department of the Board of Trade. He succeeded Sir H. Llewellyn Smith, who vacated the position to become Permanent Secretary to the Board; and his name has lately come prominently before the trading community in connection with the census of production. Deceased was in his forty-ninth year.

We regret to learn that Mr. J. Power, the Superintendent of the Neepsend station of the Sheffield United Gas Company, died somewhat suddenly last Wednesday evening, after only four days' illness, from scarlet fever and heart failure, at the comparatively early age of thirty-six. He had been for four years in the service of the Company, during which time, by his conscientious work and strict attention to duty, he had won the esteem and confidence of all the officials. He had also endeared himself to the men employed under him by his genial manner and the zest with which he entered into any scheme for their comfort and advancement. Prior to taking up the appointment at Sheffield, he was for seventeen years with the Derby Gas Company, occupying the position of Superintendent at their Cavendish Street works for a period of five years. Mr. Power leaves a wife and four young children.

Boston has lately lost its oldest, and in some respects its most notable, inhabitant, in the person of Mr. Joseph Wren, who died on the 18th ult. at the advanced age of 95. He at one time took a very active part in the public life of the town; and, after being elected a Borough Auditor in 1852, he was returned to the Town Council in 1853, and thenceforward was for many years a leading spirit in the Corporation. He was Mayor in 1857 and the following year, and again in 1867. Next to his municipal and political life, Mr. Wren will be best remembered for his association with the present Gas Company, of which he was one of the originators in 1856. In this year the original Company was enlarged, and the works put on a better footing. Mr. Wren was placed on the Board of the new Company, and for many years held the position of Chairman. At the time of his death he was Vice-Chairman, and one of the largest shareholders in the undertaking, the present prosperity of which is largely due to him. In 1846, two years after he went to Boston, the Water Company was formed, and he became a Director and subsequently the Vice-Chairman. Mr. Wren had for a long time lived in retirement, in feeble health; and the end came quite suddenly. The funeral took place in Holy Trinity Churchyard on the 21st ult. Among the mourners were several Directors of the Gas Company and the Manager (Mr. J. S. Dougall); the Auditor (Mr. S. Marjason) and representatives of the staff of the Company also being present.

# PERSONAL.

Hearty congratulations to Mr. Edward Wigglesworth, the General Manager of the Perth (Western Australia) Gas-Works, and his wife, who will this week celebrate their Golden Wedding.

We referred recently to the retirement of Signor F. Lacombe from his position as Agent-General in Italy of the Union des Gaz Company. We now learn from the Milan newspapers that his successor as General Manager of the Milan Gas-Works is Signor Guiseppe Gruss, of Milan, who will have all the general and special powers as set out in the agreement authenticated by the signature of the Italian Ambassador in Paris, where the Union des Gaz Company have their registered office.

A very successful smoking concert was held at the City of Birmingham Gas Offices on Friday evening, to make a presentation to Mr. Thomas Went, who has been appointed Superintendent of Meter Inspectors by the Gas Committee of the Leeds Corporation. The chair was taken by Mr. W. H. Powell, in the unavoidable absence of Mr. G. Hampton Barber; and the presentation of an English roll-top desk was made on behalf of the staff by Mr. A. W. Tooby, who referred in felicitous terms to the industry and ability which had characterized Mr. Went's fifteen years' service with the department. Mr. Went had been presented earlier in the evening with a "Tantalus" by Mr. S. R. Barrett on behalf of the gas-fitters. Mr. Went suitably acknowledged both gifts.

The Stoke-on-Trent Town Council have unanimously resolved to confer upon Alderman F. Geen the honorary freedom of the borough, in recognition of the invaluable services he had rendered in connection with the proceedings for the federation of the Pottery towns. It was mentioned in course of the general tribute paid to Alderman Geen that he had filled the office of Mayor for three years, and that as Chairman of the Gas Committee he had raised the undertaking to a high state of efficiency and productiveness. With regard to his work on behalf of the federation of the Potteries, it was said that too high an estimate could not be placed upon it either by Stoke or the other towns. Attention was called to the fact that Alderman Geen had acted as financial expert to the Council throughout the federation proceedings—a work involving a large amount of time and labour; and he had refused to receive the least remuneration for either his own services or those of his staff. By his self-sacrifice in this respect, he had saved the borough an expenditure of from £1000 to £1500.

## The Past, Present, and Future of Lighting.

In a pamphlet of 44 pages, a copy of which has lately reached us, M. Emile Guarini, Professor of Physics and Electricity in the National School of Arts and Trades at Lima, Peru, has endeavoured to deal with this comprehensive subject. He opens with a few general remarks, and then refers to lighting as carried out by the ancients. The bulk of the pamphlet is devoted to electricity; but in two of the twenty chapters he has something to say about gas. Though this illuminant, the history of which he shortly sketches, is acknowledged to be very generally used, he does not regard it as an "ideal mode of lighting." He says that were it not that advertisement has led unreflecting or idle people to adopt gas as a means of heating, the days of gas-works would be numbered, in spite of all the mantles and Auer burners in use; the competition of other illuminants being too powerful for it. With regard to the future, M. Guarini thinks the coming light will be a kind of artificial sun, produced by the intensification of existing illuminating agents by means of the oxides of barium, thorium, zirconium, &c. In large towns, several of these suns would, of course, be required; and they would presumably be utilized after the manner of the masthead lights of the earlier days of electric lighting. He believes that by their aid it would be possible to have light for the entire 24 hours; thereby giving a new development to agriculture and industry. We venture to doubt the practicability of the idea, though one cannot say, in view of the recent progress of science, what the future may have in store for us. The space at the author's disposal does not allow him to go very deeply into the subjects he deals with; but he has produced a readable pamphlet, the text of which is freely illustrated. It is on sale by MM. H. Dunod et E. Pinat, No. 49, Quai des Grands-Augustins, Paris, at the price of 2 frs.

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**Inspection of Gas in New York.**—We have received a pamphlet, issued by the Public Service Commission of the State of New York (Second District), containing a set of rules and regulations governing the inspection of gas which were approved on Dec. 17, 1908. They are signed by Mr. J. S. Kennedy, the Secretary of the Commission, and are followed by extracts from the laws and orders bearing upon the subject.

## THE HOMELESS GAS WORKERS OF MESSINA.

### Position of the Fund to Date.

In the "Journal" last week we published the second list of contributions to the fund which is being raised for the gas workers who have suffered by the terrible disaster at Messina. We are pleased to acknowledge the following additional amounts; bringing up the total to £339 os. 5d.

| | £ | s. | d. |
|---|---|---|---|
| Amount brought forward | 248 | 19 | 11 |
| Staff L'Union des Gaz, Paris | 12 | 11 | 2 |
| M. Frevss | 2 | 0 | 0 |
| Mr. S. Y. Shoubridge | 2 | 2 | 0 |
| Messrs. John Aird and Sons | 50 | 0 | 0 |
| Mr. S. W. Durkin | 1 | 1 | 0 |
| Messrs. Gibbons Bros. | 3 | 3 | 0 |
| Mr. A. W. Brooks | 1 | 1 | 0 |
| Mr. J. Hands | 1 | 1 | 0 |
| Messrs. Hanna, Donald, and Wilson | 2 | 2 | 0 |
| Staff and workmen, British Gas Company, Norwich (per Mr. Thomas Glover) | 2 | 7 | 4 |
| Mr J. L. Chapman | 2 | 2 | 0 |
| Evening Star Lodge of Freemasons | 10 | 10 | 0 |
| | £339 | 0 | 5 |

## "METEOR" ON MARYLEBONE.

The comments of "Meteor," in the "Electrical Times," on the struggle between fair trading and municipal trading (it cannot be truthfully described as being between gas and electricity) in Marylebone do little credit to him, and no good to the industry for the sake of which he is willing to ignore or suppress the facts. For the inference which every student of these facts will draw from the version which he thinks fit to put before his readers must be that, the honours of the fray being entirely with gas, "Meteor" thinks it wiser to "select" his facts (and then to misstate them) than to give the truth to the world that trusts to him for its information. We challenge "Meteor" to publish in his paper the dignified (and unanswered) letters which the Gaslight and Coke Company addressed to the Marylebone Borough Council, and to ask his readers if they endorse his description of them as "piteous protests;" and we challenge him to read and reply to what was said on the subject in our issue of the 19th ult. Finally, we would ask him, if he has any faith in the soundness of the case for electricity *versus* gas for street lighting, to deal with facts and not with fancies, and not to mix up comparisons made between gas and electricity for private lighting, at private lighting prices, with comparisons between the cost of gas and electricity for street lighting at altogether different prices. He merely displays his own, or counts upon his readers', ignorance when he quotes (or rather misquotes) the Marylebone figures as "a curious commentary" on the Gas Company's claim that electric light with metallic filament lamps and current at 4d. per unit is three times as dear as gas at 2s. 10d. per 1000 cubic feet, without mentioning that in the case of Marylebone the price quoted for electricity is 1¾d. per unit against gas at 2s. 5d. per 1000 cubic feet, and that prices for street lighting include other items than current and gas. If "Meteor" is as ignorant of the facts of the Marylebone case and of street lighting questions generally as his ridiculous calculations would lead one to suppose, he may be advised to read, in the "Journal" for the 19th ult., the Gaslight and Coke Company's memorandum to the Marylebone Council, which, as one of the Councillors said, gave them more information respecting the Electric Supply Committee's proposals than they had been able to get from that Committee, and which was not challenged in any single particular by the advocates of municipal trading.

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The late Colonel Joseph Bramah Cochrane, of Pedmore Hall, Stourbridge, a Director of the South Staffordshire Mond Gas Company, Limited, and of the Dudley Port Mond Gas Company, left estate of the gross value of £238,680, of which the net personalty has been sworn at £234,928.

According to "The Times," a movement has been inaugurated in the City of London for the formation of an organization whose duty it shall be to assist to secure the enforcement of the provisions of the Patents and Designs (Amendment) Act, 1907, which deal with the working of foreign patents in the United Kingdom. The matter has been brought prominently to the public notice during the past few months by certain decisions of the Comptroller-General of Patents, Designs, and Trade Marks, under which various foreign patents have been revoked. Under the Act, foreign unworked patents, of which there are probably some 30,000 in this country, are to remain effective unless they are challenged individually. It is believed that, unless there is some authority or some organization in existence ready to take action, patents which it is admittedly desirable to revoke will remain in existence because those mainly interested have not the means or opportunity of promoting the formal application which is necessary in every case. It is suggested that the Chamber of Commerce should be asked to undertake the organization of the proposed new Association. If formed, it would confine its operations to London, and be supported by subscription.

## GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 330.)

Business on the Stock Exchange last week was almost at its quietest point. It was on a more reduced scale than the previous week, quiet as that was. The tone was depressingly dull. As the week progressed it seemed to get worse, perhaps not altogether uninfluenced by two days' foggy gloom. It was account week, too, and that did not stimulate fresh business. Happily a turn for the better came before the close; and the worst prices of the week were left behind. The opening was rather languid and devoid of any marked tendency. The gilt-edged market was firm, aided by monetary movements; and the Foreign Market was calm. Tuesday was very quiet and dull, with many irregular movements. Consols gave way, and the gilded class generally was weaker. Wednesday was even worse. Consols fell $\frac{5}{16}$—provoking strong comments on the cause of this decay when money is so cheap. The depression still prevailed on Thursday, though Consols fell no further. But railways were depressed by weather and other factors, and the Foreign Market was weaker. On Friday, however, things began to amend, and less gloomy views prevailed. Consols had a partial recovery; and in most of the principal departments better prices were obtained. This gratifying tendency was maintained on Saturday; and the close of the week was its happiest period. In the Money Market, there was a good, steady demand for the month end's purposes and the requirements of the Stock Exchange settlement; and discount rates stiffened appreciably. But there was a tendency to relax before the close. Business in the Gas Market was scarcely quite as active as the week before; and though some further advances in quotation were effected, they were not altogether unchequered. Thus in Gaslight and Coke issues, there was a fractional set-back in the ordinary, which opening at 103½ touched 102⅝ later on—a fall of ¼. The secured issues were steady; the preference marking from 106½ to 107, and the debenture from 84½ to 85¼. South Metropolitan was quiet but very firm, changing hands at from 122 to 123. The debenture marked 84. In Commercials there were no dealings; but the 4 per cent. rose a point. Among the Suburban and Provincial group, business was on the most restricted scale. British was dealt in at 42⅛ free, Brighton original at 214, South Suburban at 120 (a rise of 1), and West Ham at 114½ and 115¼. The other advances were: A rise of 1 in Brentford debenture, and of ½ in Newcastle ordinary and debenture. The Continental companies were rather inactive. Imperial was unchanged, with dealings at from 179¾ to 180¼. Union was untouched, European fully-paid fetched 24⅛ *cum div.*, and ditto part-paid 17⅛ *ex div.* Tuscan was firmer at 9¼. Among the undertakings of the remoter world, Buenos Ayres had many dealings at from 11 15/16 to 12⅛, Primitiva made 6 3/16, ditto preference 5⅛, River Plate 13⅜ and 13 1/16, San Paulo 14¼, and South African from 13 13/16 to 14.

## ELECTRICITY SUPPLY MEMORANDA.

### Unbusiness-like Finance—Excess and Illegal Expenditure—The Prophets and the Losses—Increased Capital Charges per Unit—A Basis for Calculating Public Lighting Charges—Overhead Wires for Private Supply—Faint Corroboration.

Certain municipal authorities trading in electricity have been greatly perturbed of late by the inquiries that have been held by Mr. H. R. Hooper, on behalf of the Local Government Board, in respect of applications for loans. The inquiries that are particularly present in mind are those held at Maidstone, York, Epsom, Reigate, and Cardiff; and the unbusiness-like methods that have been uncovered by these inquiries have come as a rude shock to the ratepayers. Even at Maidstone, where the height of business decorum in the management of the urban affairs might have been expected, the Council stand charged with having published accounts of the electricity undertaking that have not, in a fair and frank manner, exhibited the financial condition of the undertaking. Excess expenditure beyond the loans sanctioned, and no provision for the repayment of the excess, appear to be a favourite form of backsliding on the part of the municipalist managers of these undertakings. The Local Government Board have warned; but there has been persistent want of respect for the caution, and a flouting of the authority of the Board. A warning was given to the Maidstone Corporation by the Board in 1905; but to-day the warning then made is characterized by the Chairman of the Electricity Committee as having been very feeble indeed. The Board must take their cue from this, and adopt sterner methods with those whose hides are so thick that gentle treatment has no effect. At Maidstone, the excess expenditure in respect of previous sanctions has reached £5559, and a sum of £9760 has been spent on works and machinery in anticipation of sanction. York, too, has largely spent in excess of sanctions, and so has Reigate. The difficulty is that at so many places no proper accounts for the Electricity Department are kept, so that they cannot be dissected, and the capital expenditure be traced, in order to see whether outlay has followed the directions for which loans were sanctioned. It is a deplorable state of things; and the Board have been forced now, by the indifference of so many municipalities trading in electricity, to extract promises of better behaviour in future before granting further loans. This sort of thing does not

add dignity to municipal life; but those responsible for the discreditable state of affairs have only themselves to thank.

Another offence is that several urban electricity undertakings indulge in capital spendings for purposes that are not within the four corners of their powers. The Maidstone Corporation have been letting motors on hire, and have been wiring houses; but they have no statutory authority so to do. One condition attaching to the granting of a fresh loan is that the Corporation have had to give an assurance that similar irregularities shall not occur again; and they have also to submit a proposal for clearing off the illegal expenditure within a shorter period than seven years. It is a sorry state of things that there should be such looseness in, and an absolute callousness to sound, finance and investment. At Reigate, Mr. Hooper found a heavy capital expenditure, a large extent of unproductive mains, and the whole business being run at a loss. This is a common experience in places that are purely residential. Prognostication has not been rewarded by realization. There are not a few municipal councillors to-day who recall with anything but pleasurable emotions the huge capacity they exhibited a few years ago for swallowing all the electrical prophets chose to put before them, and their own ardent championing of a business that has been a dismal failure, and a cause of perpetual anxiety. The Reigate undertaking has been going on now for nearly eight years, and has accumulated debts amounting to nearly £11,000. The Epsom undertaking has not been a financial success from the very commencement; and the rates have been drawn upon to the extent of £5640 to cover deficiencies. York has a debit balance of £4927 on revenue account; and the Local Government Board have extracted a promise that this shall be wiped off by making sufficient provision in the estimates of the general district rate during the next two years.

Poor befooled ratepayers! And this is what has come of those pretty pictures that were presented some years ago of profits that were to shift the burden of some of the local expenditure off the backs of the general body of ratepayers, and put it upon those who chose to use electricity! The result has been the opposite. The ratepayers generally have to financially support undertakings that serve the few. Yet, though but comparatively few of the ratepayers are customers for electricity, though the concern is not paying, there are these everlasting loan requirements, with increasing capital charges. The song is a joyful one when there is a microscopical fraction of 1d. saved on works' costs per unit; but little is heard of any decrease of capital charges per unit. Mr. Hooper pointed out at Cardiff that in 1904, the capital expenditure was 1·35d. per unit, and the output was then 2,300,000 units. Last year the capital expenditure was 1·41d. per unit, though the output had increased to 3,800,000 units! Now the Corporation desire sanction to a further loan of £33,228. As Mr. Boot—speaking as an expert—was saying at the meeting of the Metropolitan Electric Light and Power Company the other day, there are many electricity concerns whose capital requires reducing rather than increasing. If the present mains had only to supply metallic filament lamps, they would carry three times the number now connected. Fancy having to triplicate business in areas at present cabled! All things considered, no doubt there are several municipalities who wish they were in a position to negotiate for the sale of their electricity undertakings, as the Southwark Borough Council are doing. A Sub-Committee of that body are at the present time in communication on the subject with the London Electric Supply Corporation.

The question of the capital charges per unit is an important one. If half the electricity generated by a station is supplied at a price that does not include capital charges, then it follows that the consumers of the other half of the production will have to pay the capital charges attributable both to their own consumption and to that of consumers of the other part. It is clear that Mr. Hooper does not regard this as fair; and he applied his views at Epsom to the question of the charges for public lighting. The revenue from public lighing, he says, should be sufficient to pay the fixed charges, and a proportion of the cost of running the station, together with the generation of the current, cleaning, lighting, attendance, &c. That is the covering charge that should be made; but probably in ninety-nine cases out of a hundred, such an inclusive charge is not made. It is a point to which the Local Government Board should pay more attention. The Board, however, will be told that there is already complaint of the cost of lighting streets by electricity; and that if the public lighting is put on a sound commercial footing, the outcry from the ratepayers would be louder still. As it is, the ratepayers can get the lighting done cheaper elsewhere; and what they would say to the cost that would be arrived at on Mr. Hooper's proper basis of calculation, it is difficult to imagine. What would have happened if Mr. Hooper had had the preparation of the Marylebone estimates for electrically illuminating the streets of the borough?

The question of the use of overhead wires for the general supply of electricity has cropped up again in various places. Electricity purveyors have a settled idea that the public should put up with all sorts of nuisance and inconvenience to oblige them, and save them the extra expense of underground work. But the public are very much averse to having unpicturesque nets of wires suspended over their streets. There are already more aerial wires than the public likes; and the tendency is to find ways and means to decrease and not increase them. There are, however, many districts where it is absolutely impossible for electricity supply to become a paying business whether wires are run overhead or underground; but in those areas there is a financial balance to the suppliers in favour of the overhead system. Farnham, we should say, is a place of the kind; and the Farnham and District Electric Supply Company have made an application to the Board of Trade for permission to put their lines overhead, with the result that the Hon. T. H. W. Pelham, C.B., Assistant Secretary to the Board, assisted by Mr. A. P. Trotter, Electrical Adviser to the Board, has held an inquiry into the subject. At the inquiry, the objection of the Board to overhead wires was stated; and the feeling of the public in opposition was represented by a petition signed by some 437 ratepayers, or one-third of the total. Doubtless that one-third is the portion most deeply concerned. Mr. Pelham did not give the applicant Company much hope of success with the Board, inasmuch as their general principle is not to sanction overhead electric wires, except in unpopulous places or in "populous" places where there is "a great deal of waste land and moorland." The Board recognize that there is a very common feeling in the country against overhead wires in populous places, and that they are a great nuisance and annoyance in urban districts, or where there is a large amount of traffic. The Company do not, therefore, look like getting the privilege they seek. The view of the Board of Trade is that of some of the members of the Corporation of the City of London, though, in a moment of generosity to quell the acute distress of the City Electricity Supply Companies, they allowed wires to be run across Cannon Street. The Falmouth Corporation have (probably the time of regret will come) given consent to the use of overhead wires by the local Electric Corporation in connection with the supply of electricity for private lighting. On the other hand, the report comes from Barking that considerable trouble has occurred of late owing to constant faults on the overhead service line to the hospital; and the Electrical Engineer has been asked to report on the subject of laying a cable underground. There are other considerations than those of cost and unsightliness that weigh the balance down considerably against expediency as seen by the suppliers of electricity.

A paragraph that has gone the round of the papers has caused great elation among our electrical friends. It states that the Finance Committee of the Metropolitan Asylums Board have submitted a report on the financial results of the substitution of electric light for gas in certain of the buildings under their charge. It is stated that "the reports by the Engineer-in-Chief and the Accountant showed that, where the conditions were comparable, a financial saving had generally resulted at the Board's institutions where electricity had been substituted for gas." There is the modicum of information here; and nothing upon which to found any judgment as to what the Board's Engineer-in-Chief and the Accountant regard as "comparable conditions." The report has not that confidence about it that the reports had before electricity was adopted. A financial saving has "generally" resulted—not always; so that where a financial saving has resulted, the system of gas lighting must have been of an old-fashioned and inefficient type—much the same as the general run of cathedral and church lighting, which, we have been told, is not hard to beat by any system of lighting. Those responsible for the report have taken good care to do a little bit of hedging this time. When improvements are being effected in the methods of consumption of gas and electricity, they say, the balance may easily turn in favour of the one or the other. The Engineer-in-Chief and the Accountant require a little schooling in the matter, as they are obviously behind the times. But perhaps it is more charitable to say that they cannot all at once turn their backs on the contents of former reports, and confess that there is no gain from the outlay consequent upon recommendations, other than that coming from contrast with a former inefficient use of gas. Time has created a difference in tone; and time has a marvellous way of correcting false and superficial impressions.

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**Société Technique du Gaz.**—We learn from a circular sent out by M. Godinet, the President of the French Society, that this year's annual meeting will be held at Lyons, on June 22 and following days. The "Transactions" of the second conference of the International Committee on Photometry have just been published, and will be noticed in due course. They can be obtained from the Société, at the price of 3 frs.

**Production of Ammonia from Atmospheric Nitrogen by Means of Peat.**—At a recent meeting of the Royal Dublin Society, Dr. H. C. Woltereck read a paper in which he showed that by the various processes known only about one-third of the nitrogen contained in peat can be recovered. The evolution of the synthesis from the use of hydrogen and nitrogen with reduced iron, down to coke and peat, with air and steam, was described; and the analogy of this process with that using iron definitely proved by the use of sugar carbon, free from nitrogen—thus demonstrating the indisputable co-operation of atmospheric nitrogen.

**Another Smoke Abatement Exhibition.**—A Smoke Abatement Exhibition is to be held in the Corn Exchange, Sheffield, from the 1st to the 20th prox. The exhibits will include grates, stoves, cooking plant, heating flues, furnaces, chimneys of various constructions, and smoke consuming and preventing appliances. Three conferences will be held: (1) Manufacturers, on Wednesday, March 3; (2) Local Authorities, on Monday, March 8; and (3) Voluntary Associations, on Saturday, March 13. Delegates will be invited from Yorkshire, Lancashire, and other counties; and the Coal Smoke Abatement Society, of London, have also promised to send speakers.

# GAS BILLS FOR 1909.

[Fifth Article.]

There are a few additional Bills to be noticed to complete the review of those in which gas powers appear, promoted by Local Authorities.

In the extensive Bill being promoted by the Oldham Corporation, there is a section referring to gas supply. In the first place, it is desired that power shall be granted for the appropriation and utilization of certain described lands at Hollinwood for gas storage purposes and at Higginshaw for the manufacture of residual products. Testing for illuminating power, it is proposed, shall now conform to modern practice by the use of the "Metropolitan" No. 2 burner and the Harcourt 10-candle pentane lamp. The other clauses are of ordinary form and character. The financial clauses include a sum of £200,000 for the purchase of lands, for the construction thereon of gasholders and ordinary works for the storage of gas, for the manufacture and conversion of residuals, and for the extension of mains and other objects. The period of repayment asked is thirty years. Provision is also made for a reserve fund not exceeding one-tenth of the capital value of the undertaking. [*Parliamentary Agents: Messrs. Lewin, Gregory, and Anderson.*]

The Prestatyn District Council are desirous of purchasing the undertaking of the local Gas Company. The works were originally established, prior to the formation of the urban district, by Henry Davis Pochin; and the property now belongs to Lady Laura M'Laren, as heiress of the founder of the concern. The capital consists of £5000 and a loan of £1225. The whole has been paid up, and is exhausted. The works, it is alleged, in the preamble, are in a bad condition; and there have been numerous complaints as to the quality and the pressure of the gas supplied. Under these circumstances, it is thought desirable by the Council that the undertaking should be transferred to them, and that they should be authorized to enlarge and improve them. The Council therefore provide for transference on agreed terms, or at a price determined by arbitration, "under and pursuant to the provisions of the Lands Clauses Acts; and in the construction of the Acts, for the purposes of this section, the Council shall be deemed to be 'the promoters of the undertaking,' and the undertaking of the company shall be deemed to be 'lands taken or required for the undertaking.' Provided that, in the event of arbitration, neither party shall be represented by more than one counsel, or be at liberty to call before the arbitrator more than one engineer and one accountant as expert witnesses, in addition to any officers in the regular employment of the parties respectively." The usual supplementary provisions relating to the transfer follow. The district of supply is specified as including Prestatyn and the parishes of Meliden and Dyserth in the county of Flint. All the powers essential to the carrying on of the business are embraced in the measure. The price of gas, it is proposed, shall not exceed 6s. per 1000 cubic feet. In the prepayment clause, a similar provision is included as in the Mountain Ash Bill, excepting that 10d. appears instead of 8d. The prescribed illuminating power is to be 14 candles, with the current model testing clause. In the financial section of the Bill, authority is asked to the borrowing of the requisite amount of money for the purchase, and an additional £10,000 for improvements and extensions; the respective proposed repayment periods being 45 and 30 years. All extra moneys borrowed for the purposes of the undertaking are to be with the consent of the Local Government Board; the term of repayment not to exceed 60 years. [*Parliamentary Agents: Messrs. Baker and Co.*]

The Risca District Council are desirous of purchasing the undertaking of the Western Valleys (Mon.) Water and Gas Company, and to obtain authority to construct additional water-works and to carry on both the water and gas supply business of the district. The promoters, in the preamble of the measure, accuse the Company of not having constructed their water-works in accordance with the Acts relating to them, and of not having provided a proper and efficient water supply. The Bill therefore proposes all necessary provision for transfer on agreed or arbitration terms. In the event of arbitration, it is suggested that, "in estimating the purchase money or compensation to be paid by the Council, regard shall be had to the insufficiency of the Company's sources of supply for the needs of the district which the Company are authorized to supply, and to the fact that the existing water-works, or any part thereof, are not in accordance with the works authorized by the Company's Acts, and the plans and sections deposited for the purpose of those Acts, and are *ultra vires*." [Reference to the new water-works and the supply of water may be left until the Water Bills come under review.] The limits of gas supply require a rather detailed specification in a schedule. The ordinary powers relating to the conduct of the gas business are embraced in the Bill, with (as in several other local authority measures) the provision requiring the fittings business to be conducted on a paying basis. The limit put to the charge for gas is 5s. for gas of a standard illuminating power of 14 candles, tested by the modern means. Other than the loans required for the purchase and for water-works purposes, sanction to the money needed for gas-works will be sought from the Local Government Board. [*Parliamentary Agents: Messrs. Lees and Co.*]

The Salford Corporation are requiring further lands (as scheduled to their Bill) for gas manufacturing purposes; and they therefore ask for power to take and use the defined lands accordingly. They also seek the right to stop up and discontinue the part of West Egerton Street lying between Robinson and Liverpool Streets; and both the site and the soil of West Egerton Street and the bridge carrying it over the London and North-Western Railway they desire shall be vested in them. Provision is also made for the laying down of railways upon the site. The Corporation further request that the prescribed illuminating power of the gas shall now be 14 candles, tested by the "Metropolitan" No. 2 burner and Harcourt 10-candle pentane lamp. For purposes of the gas undertaking, the promoters wish to borrow £250,000, with forty years for repayment. A compensation and insurance fund of £10,000 for borough employees is provided for. [*Parliamentary Agents: Messrs. Dyson and Co.*]

The District Council of Sheringham have in contemplation the acquisition of the local Gas and Water Company. The Company serve the urban district and the parishes of Upper Sheringham and Beeston Regis. The capital is now £36,000, divided into £6000 original gas stock, £12,000 additional gas stock, and like amounts of water stock. Except a sum of £4000 of additional gas and water stock, the capital has been issued and paid up. The Company have also borrowed £3500 in respect of the gas undertaking, and £3500 in respect of the water undertaking. The Council seek authority to purchase on agreed or arbitration terms. In the later event, there is the limitation of one counsel, one engineer, and one accountant as experts. The ordinary series of accompanying powers consequent upon transfer is, of course, embraced in the measure. The old supply boundaries are continued. The limit of price within the urban district is 5s.; but the Council wish to be empowered to charge an additional 6d. per 1000 cubic feet for all gas supplied outside the district. The standard illuminating power is to be 14 candles, tested by the modern prescribed means. For the purchase of the works, the Council ask for authorization to borrow the requisite amount, and for the improvement and extension of the gas-works a sum not exceeding £10,000, with respectively 45 and 30 years for repayment. [*Parliamentary Agents: Messrs. Baker and Co.*]

Coming to the last of the local authority Bills dealing with gas supply. It is that of the Swinton and Mexborough Gas Board. In the preamble, there are reproduced the clauses (inserted in the Gas Company's Bill last session) empowering the Swinton and Mexborough Councils to jointly come to Parliament this session to purchase the undertaking. The expediency of the gas supply of Swinton, Mexborough, and Adwick-upon-Dearne, being under the control of a public authority is declared; and for that purpose, and to carry out the provisions of the Company's Act of last session, it is proposed that a Gas Board should now be incorporated and constituted, consisting of, in all, twelve representatives of the Swinton and Mexborough Councils. The present limits of supply are continued. It is provided that the notice to purchase (on agreed or arbitration terms) shall be served on the Company within six months after the passing of the Act. In addition to the sum to be paid to the Company for the undertaking, the Board will be under obligation to pay them the costs of obtaining the 1908 Act, the reasonable costs of winding up the concern, and such compensation to the officials of the Company (on the basis of the salaries paid to them on January 1 last year) as, failing agreement, may be fixed by arbitration. But, in fixing such compensation, the arbitrator is to take into account any reasonable offer by the Board to continue officials in their employment. Where, however, an official has been not less than twelve years in the service of the Company, the refusal to accept employment under the Board shall not be any bar to compensation. All the necessary powers for enabling the production, distribution, and sale of gas by the Board are embraced in the measure. Again, there is the fittings clause, accompanied with the requirement for the adjustment of finances in the fittings department so that income covers expenditure. The limit set to the price of gas is 4s. per 1000 cubic feet for 14-candle gas, tested as now provided. The Council desire power to borrow all money necessary to purchase; and, for the extension and improvement of the undertaking and for working capital, such sums as the Local Government Board may determine. Regarding the amount required for paying the costs and expenses appertaining to the Act, it is proposed that it shall include £400, part of the taxed costs of the opposition of the Mexborough Council to the Company's Bill of 1908. It is contemplated that the period for repaying the purchase money and money borrowed for the discharge of the Company's mortgage debt shall be forty years; and for any other moneys such period as the Local Government Board may determine. [*Parliamentary Agents: Messrs. Lees and Co.*]

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**Presentation to Mr. James Broadhead.**—A very pleasant evening was recently spent at the offices of the Great Grimsby Gas Company, when the staff and workmen entertained Mr. and Mrs. Broadhead at a "high tea" and smoking concert. The object of the gathering was to present Mr. Broadhead, on his retirement after 45 years' service, with a handsome entrée dish and muffineer as a token of esteem. The presentation was made by the Assistant-Manager, Mr. Saynor, who has been associated with Mr. Broadhead during the past 24 years; and several of the other old servants also spoke of the good feeling that had always existed between Mr. Broadhead and all the workpeople. The opportunity was taken of giving a hearty welcome to the new Manager, Mr. John Terrace.

# ROUND THE WORLD—AND SOME GAS-WORKS.

By Maurice Graham.

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## XXI.—THROUGH WESTERN CANADA TO WINNIPEG.

The climate of Vancouver Island and Western Canada is perfect in winter and summer; the temperature rarely rising in summer above 75° Fahr. The Island, to use the term of the residents, has barely been "scratched" yet, as regards mineral, lumber, and agricultural wealth. It is certainly the district for the Britisher to settle in, with everything in his favour. Nobody need be out of work; there being plenty to do and a great demand for labour of all sorts, with a minimum pay of 10s. per day for anybody who combines elbow-grease and will power. Loafers, grumblers, and snobs, &c., who have gone from England to Western Canada are having a bad time, simply because they thought the residents of Canada would receive them with open arms because they came from England. This class of man is not wanted in Canada any more than he is in England.

The Western towns visited by the writer are just as well laid out as, and have a better class of building than, the average English town. People are more on the alert, owing to the more rapid growth of the towns; and the latest improvements of England, America, and Germany are at once taken advantage of and adopted. The sooner the Britisher at home places these Canadan cities on a level with, or higher than, his own, the better he will be able to realize the real up-to-date knowledge of our Canadian brethren. A Canadian wants facts and acts, deeds and dollars. The English idea that Canadians are chiefly descended from the British is entirely erroneous. Canada is becoming more and more submerged by peoples from the various nations of Europe; and the percentage of British blood is rapidly decreasing. Canada is going through the same process of development, both as regards the opening-up of the country and the method of populating the land, that America did. A short time ago there was issued from the Census and Statistics Office at Ottawa an important document giving the census of the three agricultural and grain-producing provinces of Manitoba, Saskatchewan, and Alberta. In 1906, the farms totalled 122,398. During the fifteen years from 1891 to 1906, the number of immigrants was as follows:

| | | | | |
|---|---|---|---|---|
| From United States . . . | 16,344 families, or | | 70,703 individuals | |
| ,, Austro-Hungary . . | 10,650 | ,, | ,, 52,639 | ,, |
| ,, Great Britain . . . | 10,908 | ,, | ,, 31,755 | ,, |
| ,, Russia . . . . . | 5,018 | ,, | ,, 24,590 | ,, |
| ,, Norway and Sweden . | 3,830 | ,, | ,, 11,968 | ,, |
| ,, Germany and Holland | 1,986 | ,, | ,, 7,734 | ,, |
| ,, France and Belgium . | 1,131 | ,, | ,, 4,487 | ,, |
| Total . . . . | 49,867 | ,, | ,, 203,876 | ,, |

It will, therefore, be seen from these figures how quickly British influence is being buried under the influx from other nations.

### NEW WESTMINSTER, BRITISH COLUMBIA.

Before leaving Vancouver, the writer paid a visit to New Westminster (B.C.), which is about 15 miles distant. It was once the capital of British Columbia, and is situated on the River Fraser, and is noted for its salmon fisheries and lumber trade. Through the rapid growth of Vancouver and through the electric tramway which connects the two towns, New Westminster is receiving a large number of new residents. The land between the towns is at present "bush;" but this is being rapidly cut down and converted to fruit land, commanding $200, or £40, an acre.

A visit was paid to the gas-works, of which Mr. W. E. Brown is the Manager. These small works were founded in 1889, and

**Photograph No. 177.—General View of the Town of Calgary, Alberta.**

are at the present time owned by Mr. James Cunningham, a local ironmonger, who bought them from a former Company when in liquidation. He is a very old citizen, and has no wish to advance the prosperity of the concern by adding improved gas plant or increasing the gas-mains. A prohibitive price has prevented the gas-works changing hands, and people have avoided using any gas because of its high price—14s. per 1000 cubic feet. Householders, in fact, were advised "to keep on with wood fires and electric light, as gas was not reliable and too expensive"! So there are only about 250 consumers; while the population of the district is 13,000.

The works were not built on a suitable site; and the cartage of coal from the wharf on the Fraser River is a heavy item of expenditure. On the wharf, the cost of coal (Wellington) averages 16s. per ton, with some 4s. more for delivery at the gas-works. On the 4-acre plot of land is the retort-house, with three beds of 14 retorts, heated by shallow regenerators. The other apparatus is in very bad condition, both as regards insufficient capacity and state of repair. The 60,000 cubic feet gasholder is in bad repair and can hardly stand the strain of the piles of bricks loaded upon its poor crown. The annual make is 12 million cubic feet; and the maximum daily output 45,000 cubic feet. Tar sells retail at 10d. per gallon; and the liquor is run to waste.

There are 5½ miles of mains in the town; the pipes being so heavily choked with deposit that considerable pressure has to be given to get any gas through them. The lighting power of the gas averages 19 candles. Exorbitant prices are charged for gas-fitting, meters, and cooking-stoves, all of which are supplied through the gas-works' owner's hardware stores. Notwithstanding all these drawbacks and all the deterrents to the sale of gas, yet there is an increase in the consumption of 12½ per cent. per annum.

The public lighting is chiefly by electricity, owing to the fact that the Corporation retail the current to the inhabitants. The British Columbia Electric Railway Company obtained the concession to harness the river and neighbouring falls; and they supply the Corporation with current at a cheap rate.

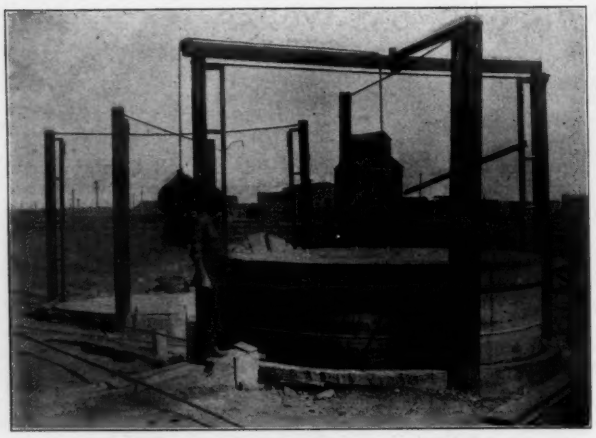
The writer learnt that about twelve months ago an American Syndicate had obtained a franchise for building another gas-works, but had done nothing. Just before the writer, however, left, the local newspaper contained an advertisement to the effect that "The Royal Gas Company, Limited," had been formed for providing the town of New Westminster with an efficient service of gas lighting.

The journey from Western Canada on the Canadian Pacific Railway is alongside the Fraser River, through magnificent scenery and fertile country, over the Selkirk Range, where a stop is made at Glacier, and then through the snowclad and rugged Rocky Mountains. In contrast with these magnificent Canadian mountains, the American "Rockies" should be called "lowlands and hills." The towns of Field, Laggan, and Banff were in turn visited, after which the prairies—the home of the cowboy—come suddenly into view. Enormous territory of vast sameness is run through; it has no trees, but is pervaded with a romantic spirit.

### CALGARY.

Calgary is the centre of the prairie district, and is a thriving and hustling town in close connection with Spokane, a town over the border on the American side. Consequently, Canadian Calgary is rapidly becoming Americanized. It is in the province of Alberta, and is known as "The Sirloin of Canada." It is the headquarters of the Canadian Pacific Railway west of Winnipeg, and has a present population of 25,000; but this will be doubled within two years, as immigration from all nations tends to flow in this direction. It is the town from which the gigantic irrigation scheme of the Canadian Pacific Railway starts, irrigating 3 million acres of land at a cost of a million pounds sterling. The water is taken from the Bow River, which has a flow of 40,000 cubic feet per second in the summer months. Civil engineers interested in this class of water scheme should certainly visit the district. The water, which is under the administration of the Government, is supplied from May to October in each year at the rate of one cubic foot per second for each 150 acres, the charge being 2s. per acre. The value of the land has now risen to £5 per acre, and the finest wheat crops are grown. Great herds of cattle, sheep, and horses are seen in passing through these vast cultivated prairies.

The buildings of Calgary are substantial, as will be gathered from Photograph No. 177; and works, factories, and warehouses



Photograph No. 178.—Original Gasholders at Calgary.

of all description are being rapidly put up to cope with the enormous development. Much could be written about the prosperity of the place; but the writer once more turns his attention to the question of gas supply. The franchise or concession for the supply of gas was granted on June 30, 1903; and the Calgary Gas Company, Limited, came into existence with works having a capacity of 60,000 cubic feet per day, but with holders for 2500 cubic feet only. The first gasholders, of primitive design, with crude timber framing and flat crown, are shown, as a matter of curiosity, in Photograph No. 178. Plant was built in 1904; and in November of the same year, 3 miles of mains were laid. To show the rapid growth of the district, it may be mentioned that in July, 1905, the works had to be remodelled, as the gas consumption then reached 175,000 cubic feet per day. A new gasholder of 60,000 cubic feet capacity was erected; and this, with other buildings on the works, is seen in Photograph No. 179. The mains were also overhauled; and this work is still going on, owing to the increase that is taking place.

It was in 1905 that the present Engineer and Manager, Mr. A. I. Payne, a graduate in civil engineering of Princetown University, U.S.A., took control. He had previously been a constructional engineer with the Economical Gas Apparatus Construction Company, Limited, and afterwards held the appointment of Manager at the works of the Nelson Gas Company, British Columbia. On taking up his present post, Mr. Payne immediately commenced an aggressive new business campaign, which he has vigorously prosecuted ever since. The results, which were given to the writer in the form of a schedule full of interest, show what energy must have been put into the business by the Engineer and Manager. In January, 1906, there were only 110 meters fixed; but by October, 1908, 690 meters were in use.

The gas-mains are made of steel, and are laid at a depth of 4 ft. 6 in., in lengths of 22 feet each; being joined together by Hammon's couplers. The writer must certainly say, from what he has seen of this design of joint or coupler, that it allows for twisting, sinking, contraction or expansion, without any leakage of gas. It is a flexible joint of two flanges, with solid rubber ring sleeves, a centre steel core, and four (or more) bolts. The system is one that is largely used in America and Canada, and has proved a great success. The depth the mains are laid is, of course, due to the intense frost, which even penetrates deeper than the pipes. The temperature varies considerably and suddenly from 50° below freezing point to 75° Fahr.; so that the gas-mains are well tested as regards contraction and expansion. Notwithstanding this, the unaccounted-for gas is only 4 per cent. of the output.

The class of coal used is known as "Crow's Nest Pass," and costs 21s. per ton delivered at the gas-works. It yields 10,000

Photograph No. 179.—New Gasholder and Works at Calgary.

cubic feet of gas, 1400 lbs. of coke, and 4 gallons of tar per ton of 2000 lbs. [The Canadian and American ton is what is called the "short ton" of 2000 lbs., as compared with the British or "long ton" of 2240 lbs.] The coke is clean and large, and finds a ready market at 24s. per short ton. Tar commands the price of 27s. per 44 imperial gallons, or about 7¼d. per gallon.

The price of gas is 8s. per 1000 cubic feet for lighting, 7s. for cooking, and 6s. for industrial and power purposes. But in the last case, the quantity consumed must exceed 12,000 cubic feet per month in order to take advantage of the rate quoted. Discounts of 10 per cent. are allowed for prompt payment of lighting and heating accounts, and 5 per cent. on power accounts. The gas sales are divided in this proportion: 28 per cent. for lighting, 45 per cent. for cooking, and 27 per cent. for power and manufacturing purposes.

Gas lamps and fittings are sold by the Gas Company at 5 per cent. over cost price, as an inducement to adopt gas and thus extend its consumption. The fittings include high candle power Welsbach lamps, which are either sold outright or on the rental purchase plan. Maintenance is free; only renewals being charged for. Every attention is given to gas cookers, fires, and stoves, as the Gas Company realize that the complaint list is smaller with good apparatus guaranteed by them than it is when the consumer buys any cheap rubbishy thing from hardware men, who have no further interest or responsibility as regards successful working, and who are not experienced in the regulation of gas appliances to obtain the highest efficiency and heat from burners. The number of gas-stoves at present in use is 300.

The Company do their own gas-fitting and the piping of buildings within their franchise. Special rules and regulations have been drawn up which all architects, contractors, and gasfitters must conform to before the gas is turned on. An inspection is made by an authorized official of the Company and a certificate granted before permission is given for the gas to be supplied.

The Company have an authorized capital of £20,000. Of this, £18,000 is fully paid; and, in addition, there are debentures to the amount of £10,000. For the year ending April 30, 1908, the gross earnings were £6401, and the net earnings £2396.

Every reasonable method of advertising is taken advantage of by the energetic Manager; and a series of monthly advertisement calendar cards, with reproductions of water-colour pictures of a refined style, has been a source of great attraction, and is much sought after.

Extensions to the gas plant at Calgary are always being made; and the writer was reminded in this respect of his visit to some of the Japanese works where the rate of increase, as previously shown, is 100 per cent. per annum. Although the Calgary Gas-Works are not at present numbered among the larger ones, yet it was quite interesting to follow out the development of the undertaking in this prairie town. It is in the early days of a gas engineer's life that he experiences the greatest difficulties and solves (to him) the greatest problems. Mr. Payne need, therefore, have no fear that in the near future, when he finds himself called upon to fill a position entailing more laborious, but not more difficult, duties, he will be well able amply to satisfy all requirements.

Onward East, through the town of Medicine Hat, where natural gas is utilized for working gas-engines, which, in turn, drive large pumping plants used for irrigation purposes, Moose-jaw, another large town in the centre of the prairie, is passed; and, after a few more hours, the wonderful grain district of Manitoba is run through and Winnipeg is reached. During this long journey, the prairies were covered with snow; but the wooden snow-guards placed along the railway line prevented the snow drifting on to, and blocking up, the track.

## WINNIPEG.

Winnipeg is a brisk and bustling city, and the capital of Manitoba. It is another instance of a Canadian city becoming completely Americanized owing to the adjacency of American cities—

Photograph No. 180.—Retort-House and Coal-Stores at Winnipeg.

in this case, Minneapolis and St. Paul, U.S.A., which are only 500 miles away and which do the bulk of the trade which is brought to them by express railway. Winnipeg, which has a population of about 120,000, is the centre of the immigration department of Canada, and controls the distribution of immigrants arriving from all countries. All arrangements are made for their housing and feeding for the usual two or three days until employment is found for them.

There are over twenty-seven different nationalities, speaking a like number of languages, in Winnipeg; so that it is easily the most cosmopolitan town in Canada. The climate is a dry one, with a large proportion of sunny days. During the writer's visit [November of last year], the thermometer registered 30° Fahr. below freezing point, yet the sun in the day poured down and was quite hot; but the air being dry, it has no effect upon the snow-clad city. The winter temperature goes to 50° Fahr. below freezing point; while in summer the average is 75° to 80° Fahr. The city is noted for the absence of deep snow, which is owing to the peculiar dry, warm air breaking up the heavy falls of snow into powder and the wind blowing it away. Winnipeg is also noted as being the largest grain market in the British Empire. The size of its Grain Exchange would astonish an Englishman at home, as he could put his local exchange in one corner of it.

A telephone conversation fixed up an appointment with Mr. J. Dunderdale, the Manager of the gas-works. Walking along the railway track for half-a-mile, a branch line appeared, which ran into the gas-works. A pleasant surprise was the result of the introduction to the Manager, for Mr. Dunderdale was recognized by the writer as one who, about twenty-three years ago, had worked as a mechanic with him in the boiler shop of Messrs. R. Dempster and Sons, of Elland, Yorks. Mr. Dunderdale left England in 1885 for Australia, and entered the employ of the Australasian Gas Association. Under the direction of Mr. George Swinburne, of Melbourne, he erected over twenty-two gas-works in that Colonial Continent. In 1893, he left for Montreal and erected works there; afterwards accepting the position of Works' Manager of the Ottawa Gas Company, which post he held for nine years. When the new coal-gas section of the Winnipeg Gas-Works was decided upon (owing to the excessive price of oil prohibiting the use of water-gas plant), Mr. Dunderdale secured the appointment as Gas-Works' Manager.

The gas-works are owned by the Winnipeg Electric Railway Company, who also supply electric light and power and run the trams. The current is obtained by harnessing the Red River 50 miles above Winnipeg. The General Manager of the whole Company is Mr. W. Phillips. After exchanging ideas on the development of the gas industry in Australia and Canada, Mr. Dunderdale kindly furnished information about gas affairs in Winnipeg. The works were established in 1883, and then consisted of a water-gas plant only, which was erected by the Merrifield-Westcott Company. Owing, however, to the distance and cost of railway transit for oil, it was not possible to continue the manufacture of water gas solely, and the plant is now kept as a stand-by.

The present area of the works is 264 feet by 1100 feet; the site being a most valuable one near the railway station. The view of the works from a distance is not like the usual one of an English gas-works, as there are only three large buildings in all. Two of them are seen in Photograph No. 180, which shows the retort-house and coal-stores. The former is a well-designed and substantial building, with height sufficient for retort-house machinery if necessary. Adjacent, and parallel to it, are the coal-stores, which contain 4000 tons. The coal, which is Pennsylvania American, comes by boat to Port Arthur and thence by rail to the gas-works, where it is unloaded into a hopper and breaker, then elevated, and conveyed along the stores. Its cost is about 17s. per ton, and it produces 10,000 cubic feet per ton, with a good, large-sized crystal coke, which sells at 28s. per ton. The stores are worked out regularly from one end to the other, so as to prevent any chance of spontaneous combustion. An elevator raises the coal from the stores to two overhead bunkers in the retort-house, one on each side of the bench. From them, the stokers receive their 3 cwt. charges, which are weighed on a platform machine by the foreman on duty.

There are two benches of retorts working, comprising twenty beds of sixes, oval shape, 9 feet long. The stoking is done by hand; but machinery will be introduced when the line of retorts becomes long enough to make it pay. The heating arrangements

Photograph No. 181.—House covering the Condensers, Boilers, Exhausters, Washers, and Purifiers at Winnipeg.

of the retorts are on the American recuperative system; the work having been carried out on Dell's patent by the Missouri Fire-Brick Company, U.S.A., in 1905. The heating was simply perfect; the charges were drawn and were thoroughly burned off, clean and free from gas and tar; and the retorts were a beautiful, regular carbonizing colour, indicating satisfactory working of the producer gases inside the setting. With the writer's lengthy carbonizing experience, he can safely say that this was the best heating he had seen on his world's tour up to date. As stated, the weight of the charges is 3 cwt. each, every four hours, or a total of 18 cwt. per 9-foot retort in 24 hours; each retort producing about 10,000 cubic feet per 24 hours. The stokers charge and draw ten retorts in eight-hour shifts, which equals 3 tons per shift. They are paid at the rate of $75 per month, and have one day off in every three weeks. The ascension pipes are 7 inches diameter, and the hydraulic main is in one piece; the seal being regulated, and the tar drawn off, by a tar and liquor tower at the end of the bench.

After examining the furnace, Mr. Dunderdale expressed his views on the amount of fuel used for heating so as to obtain good and regular heats and to overcome the great fluctuation and sudden changes in the temperature of the surrounding atmosphere. He did not believe in the theory of working at 10 lbs. of fuel per 100 lbs. of coal carbonized merely to save on the fuel account, and at the same time starve the furnace of its heat storage, and thus fail to get the whole of the gas from the coal. He considered that it was like half feeding, or sparsely feeding, a horse to save the food, but at the same time losing the extra power the horse could exert if properly fed. The power thus lost was of more value than the food saved. [Mr. Dunderdale's fuel account was 16½ lbs. per 100 lbs. of coal carbonized.] The outcome of this practice is seen daily in many gas-works where the works' chemist analyses the furnace gases, &c., and the foreman is reprimanded because his fuel account is above 15 lbs. per 100 lbs. of coal carbonized. The result is that the charges are not always thoroughly burnt off, and there is still some gas left in the coke; but the manager is satisfied because his fuel account is kept low—at the loss of thousands of feet of gas gone to waste.

Passing on to the condensers, these are of water-tube design, and were made in Winnipeg. They are in the building shown in Photograph No. 181, which comprises the boiler-house, exhauster-room, washers, and purifier house. The condensers are thus protected from the sun in summer and the intense cold in winter.

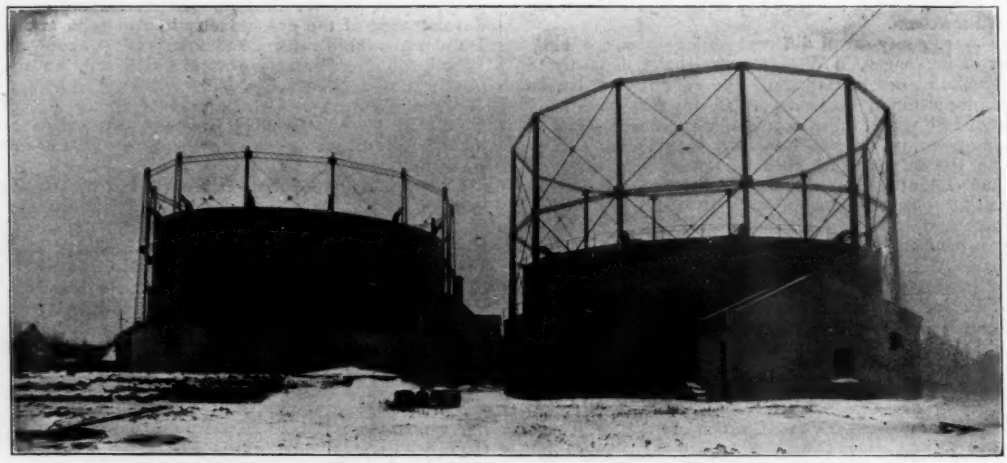
The boiler-house contains three tubular boilers, fired with coke. These provide sufficient steam for all the power required and for supplying the heating apparatus, which is in every room of the works. A notice hung on a steam-valve handle read as follows: "Keep me open or I will burst"—showing the intense cold to be overcome.

There are two Waller exhausters of 75,000 cubic feet per hour each; one Livesey washer; and one of Holmes's washer-scrubbers for 1½ million cubic feet of gas per day.

The purifier-house portion of the building (which is at the nearest end of Photograph No. 181) has a stage floor supporting four 25 feet square dry-sealed boxes with discharge lids underneath. The oxide is elevated to an overhead distributing hopper, from which the boxes are supplied. The whole arrangement works smoothly and gives every satisfaction. The Whessoe Foundry Company, of Darlington, were the Sub-Contractors for this plant.

The same firm also made the larger of the two gasholders, seen in Photograph No. 182, which contain 500,000 and 300,000 cubic feet respectively. The steel tanks are above ground, and are walled in about 3 feet distant from the tanks—steam-heaters being fixed in the intervening space to keep out the frost. The usual anti-freezing apparatus is working in the cups of the gasholders.

The maximum daily make of the works is nearly a million



**Photograph No. 182.—The Two Gasholders at Winnipeg. The Steel Tanks are Walled-in, and have Steam-Heaters in the Intervening Space.**

cubic feet, and the annual output reaches 250 millions. There is no bye-products plant of any kind.

All the gas-mains in the works are 18 inches in diameter. The street mains, which total up to 65 miles in length, are laid at a depth of 5 ft. 6 in. from the road surface to the top of the pipe, to guard, of course, against the intense cold. The cost of laying these mains is, on an average, about 15s. per foot.

When the question was inadvertently asked: "Are the service meters wet or dry"? a smile was the reply, and a reminder of 50° Fahr. below freezing point. Slot-meters have been introduced to the number of 2000, and have proved quite satisfactory.

The city streets are lighted very sparingly by electric light; reliance being put upon the lights in shop windows to assist the public illumination. Gas is not pushed for lighting purposes, but only for cooking and heating. There are 4234 cooking-stoves in use, and the same number of heaters; but only 3500 Welsbach lights in the houses and no ordinary burners. It is of interest to note that from 11 a.m. to 1 p.m. the gas consumption is 100,000 cubic feet more than the make during that period of the day.

Everything is sold and nothing is hired out by the Company; the reason being the varying and moving nature of the population. Gas-engines are not even sold, as electric-motors are introduced for all power purposes in the town. There are no meter-rents; but a charge is made of 10d. per foot-run of service-pipe from main to meter. The general gas pressure at the outlet of the works is 5 inches, as the consumers prefer a good pressure on their cooking-stoves, so the Manager informed the writer.

The price of gas is 6s. per 1000 cubic feet, or 5s. 3d. net, for lighting; and 4s. 10d. for cooking and heating. The price is fixed high so that people cannot afford to use gas for lighting, and, consequently, adopt the Winnipeg Electric Railway Company's other illuminant—electricity. This is generated by water power, which they have available to the extent of 60,000 H.P. It thus pays them best to dispose of their low-priced electric current. Nevertheless, the gas consumption has trebled itself in the last four years, and the number of consumers is now 7000.

In conclusion, the writer expresses the opinion that the Company are fortunate in having as their gas-works' Manager such a thoroughly practical and common-sense man, and one of such large and varied experience in different climates, as Mr. Dunderdale. The general erection work and manipulation of the various gas apparatus under his charge are ably conducted and controlled by him. He knows where to look for, and how to remedy, any defects that may show themselves.

The designers of these complete gas-works, Messrs. Merrifield and Westcott, of Toronto, who acted as Consulting Engineers, must also be complimented on their successful work.*

* An illustrated article dealing with the completion of the first section of the new works at Winnipeg appeared in the "JOURNAL" for Feb. 6, 1906, p. 345.—ED. J.G.L.

[In the previous article, No. XX., reference was made, in connection with the Vancouver Gas-Works, to the storage accommodation. It should have been mentioned that the capacity of the last gasholder was 500,000 cubic feet; making the storage capacity of the works 850,000 cubic feet, not 350,000 cubic feet as stated. Then, again, the size of retorts in the four complete settings should have been given as 28 in. by 16 in. (American standard size), instead of 26 in. by 15 in.]

**Manchester and District Junior Gas Association.**—We learn from the Hon. Secretary (Mr. J. Alsop) that the next meeting of the Association will be held on Saturday afternoon, in the Technical School, Manchester, when Mr. H. H. Mercer, of Widnes, will read a paper on "The Preliminaries to Increase Storage Capacity." The annual meeting of the Association is fixed for the 6th prox.

# VICTORIAN GAS MANAGERS' ASSOCIATION.

### Third Annual Meeting.

The Third Annual Meeting of the Association was opened in the Board-Room at the Gas Company's Offices, Grenville Street, Ballarat, on Tuesday, Nov. 4, 1908. Mr. S. E. FIGGIS, Engineer to the Company and President of the Association, was in the chair. There was a full attendance of members.

#### REPORT AND ACCOUNTS.

The PRESIDENT, opening the proceedings, expressed his great pleasure at seeing a good meeting, and said he hoped they would have a very pleasant time. The first item on the programme was the annual report of the Council and the balance-sheet. The members would notice that there was a debit balance of £4 11s. 10d.; and it would be for them to consider the best means of meeting it. He moved that the report and balance-sheet be adopted.

Mr. T. LORD (Geelong) seconded the motion; and it was carried.

The PRESIDENT said they must now consider the best means of getting rid of the debit balance. Perhaps the Hon. Secretary had something to say with regard to it.

#### COST OF THE TRANSACTIONS.

The HON. SECRETARY (Mr. P. C. Holmes Hunt) said it seemed evident from the figures that they could not very well make ends meet at the present rate of subscription, unless they were paid something extra for sales of copies of the Transactions of the Association. Of course, a heavy item in the expenditure was the printing of the Transactions; but he thought, from the discussion both last and the previous year, it was considered that the expenditure was well worth incurring. The record of each year's work was, so far, complete; and he would therefore be sorry to see the £16 saved by not publishing the Transactions. The Council decided last year that any new member or outsider who wished to purchase a copy of the Transactions could do so for 3s. 6d. They only sold one copy last year out of the hundred copies printed. By paying 3s. 6d. each per copy every year, they could only just get through financially. He thought that it would be as well to hear an expression of opinion from members who were not on the Council.

Mr. A. T. FROST (Beechworth) said that, with the view of testing the feeling of the meeting, he would move that the annual subscription be 15s.

Mr. T. GALE (Footscray) seconded the motion.

Mr. R. O. THOMPSON (Melbourne) said he thought it much better to make the subscription 15s. annually than to require each member to pay 3s. 6d. for a copy of the book as well as the present subscription.

The motion was carried.

#### THE LATE SIR GEORGE LIVESEY.

The PRESIDENT said, before they proceeded to the real business of the meeting, he should like to refer to the great loss the gas world had suffered by the death of Sir George Livesey. When the sad news was published, the Hon. Secretary sent a cablegram of condolence to Lady Livesey as follows: "Profound regret. Victorian Gas Managers' Association deeply deplore loss." It was only right that the meeting should show its feeling on the matter by way of endorsement of the action of the Council, and he therefore moved: "That this meeting of members of the Victorian Gas Managers' Association deeply deplores the death of Sir George Livesey, and desires to place on record its high appreciation of the eminent services rendered by him to the gas industry."

Mr. R. O. THOMPSON said it was his melancholy duty to second the motion. The gas world had sustained a great loss, in whatever way they looked at it, by the death of Sir George Livesey. The success he made of the Gas Company whose headquarters were in the Old Kent Road was a matter of notoriety throughout the world; and whether they regarded him as a gas engineer or as an able designer, he was equally eminent. He constructed at the East Greenwich works a gasholder which was for many years the largest in the world, though it was ultimately surpassed by one built in New York at the Astoria works. Those who had seen the one at East Greenwich had been surprised at the enormous size of it, and at its rising top lifts elevated above the standards. Sir George Livesey was a man of bold ideas, but a plain, simple, and straightforward man. He was the first who brought before Parliamentary Committees the sliding-scale system as applied to gas companies. In this State, it had been applied to the Metropolitan Gas Company of Melbourne. Sir George was the great man in the movement to abolish the sulphur clauses. Frequently he was called upon to give advice before Parliamentary Committees. A few years ago he was given a title, which only confirmed the estimation in which he was held in the gas world generally. During the great trouble he had in the year 1890, he was instrumental in introducing his profit-sharing scheme, which he carried out to its logical conclusion. This scheme had been adopted by a minority of gas companies in the old country, and no doubt it would be carried out by the majority later on. Sir George was helpful to the various guilds and institutions in London which assisted in educating young men, especially young gas men and budding engineers. In fact, in all movements in which the interests of gas could possibly be advanced, he was active during his life. He (Mr. Thompson) knew him nearly forty years ago in the Old Kent Road. When he was home four years ago, he saw him, and he was the same George Livesey. At meetings he had a remarkably straightforward manner of speaking. He delivered many addresses on the gas industry at meetings of Associations, and his loss would be greatly felt—in fact, there was no man to fill his place.

The motion was carried by the members rising in their places.

#### NEW MEMBERS.

The HON. SECRETARY reported that three nominations of new members had been approved by the Council—viz., Mr. E. Tipper, Manager of the Box Hill Gas-Works; Mr. H. Dyson, Manager of the Seymour Gas-Works; and Mr. N. S. Kennedy, Junior Assistant in the Metropolitan Gas Company.

The two first-named gentlemen were unanimously elected members; and the latter was admitted as a junior member.

### PRESIDENT'S ADDRESS.

The PRESIDENT then delivered the following address:

Since our last meeting, we have suffered the loss of one of our original members—Mr. Burall, of Warrnambool—who always took great interest in the affairs of the Association. Our sympathy will also be extended to Mr. Bowman, of Sale, whose father lately passed away at a ripe old age. He was one of the pioneers of the gas industry in this State, having erected more than one of the country works; and in its early history he was connected with the Ballarat Gas Company.

We share also in the loss the whole gas world has suffered by the death of Sir George Livesey. Possessed of a thorough knowledge of gas engineering and all that pertained to the industry, he combined with it the rarer art of managing men. The success of the co-partnership scheme which he inaugurated at the South Metropolitan and South Suburban Gas-Works, and with which his name is identified, testifies to the able manner in which he grappled with, and endeavoured to solve, one of the most difficult problems of the age; and it is a tribute to his wisdom that this scheme has been adopted by other companies. He always took a broad view of the responsibilities of his position, and zealously safeguarded the interests of both the producer and consumer of gas. A man of great force of character, strict integrity, and kindly disposition, he at all times strenuously endeavoured to follow the Golden Rule; and he has left behind him a noble example of unselfish devotion to high ideals, the attainment of which in a great measure he was privileged to enjoy. Our Secretary, on behalf of the Association, has forwarded a cablegram of condolence to Lady Livesey.

It is a happy coincidence that our meeting should be held here in the jubilee year of the Ballarat Gas Company; and I have much pleasure in welcoming you to the Golden City. This town, which has held pride of place for so long as a gold producer, tells its own tale, indicative of the stubborn grit of our forefathers—worthy sons of the Empire. Fifty years is not long in the history of the old-established cities of Europe; but as regards Ballarat, it embraces pretty well its life history. Half-a-century ago this place contained but a few streets and buildings, and was merely a huge mining camp, where there were no class distinctions, and where every man's aim was to strike a rich patch in the shallow alluvial workings, and make his fortune as quickly as possible, so that he might return to the old country.

The early history of this modern Eldorado reads like a fairy tale. Fortunes were made from claims about 20 feet square. I have heard of as much as 34 lbs. of gold being extracted from one tub of wash dirt; and it was no uncommon thing to see 100 oz. of gold obtained from a bucketful of ore. As these shallow deposits became exhausted, the miner turned his attention to the deeper alluvial leads, which contained a marvellous amount of gold. I am not overstating when I say that, from this source alone, Ballarat and its district produced many millions of pounds worth of the precious metal. One mine named the Band and Albion Consuls paid over £1,000,000 in dividends, and in the palmy days used to obtain 1000 oz. to 1500 oz. of gold per day; and I myself have seen 400 oz. washed from one machine of dirt.

It may interest you to know that this was the first mine in Australia to be lit underground with gas. We erected a small gasholder on the surface (this holder is performing good duty in the works now, though nearly fifty years old), into which the gas was forced. Pipes were taken down the shaft and then into the various drives; and as the underground workings extended for many miles in all directions, a large amount of gas was consumed. In fact, I think I am correct in saying that it was the largest consumer the Company ever had.

When the deep alluvial leads were stripped of their gold, attention was directed to the quartz veins which fed the alluvial gutters; and from these many hundreds of thousands of ounces of gold were obtained. Ballarat possesses several rich lines of lodes, some of which are worked out; but others are still yielding

well, and are likely to do so for many years to come. Up to the end of 1905, Ballarat and its district has produced 19,375,000 oz. of gold, worth £77,500,000.

### LEAKAGE.

It is only natural that, with a city whose streets are so undermined, and which are in consequence continually subsiding, the Gas Engineer should have an anxious time regarding his leakage account; and when to the effects of mining is added the fact that the streets for scores of miles are lined with avenues of splendid trees, whose roots winding round the mains and services constantly fracture them, one can easily understand the difficulty that exists in keeping the unaccounted-for gas within reasonable limits. I know that the experience of some of the members present is very similar to my own; but I doubt very much if any town is worsely situated than Ballarat in this respect. We have one stretch of 4 miles of 5-inch mains where the whole route is gradually subsiding; and the escaping gas can often be lit 200 or 300 feet distant from the actual breakage. Cases have occurred where the surface of the roadway has suddenly dropped many feet, leaving the fractured ends of the gas-main exposed on both sides.

All this necessitates our keeping a very strict look-out for leaks; and as often as possible we send out men who use every device for detecting fractured pipes. When I state that we have over 70 miles of mains, you will see that this is no light task. Now I am going to tell you of one means we have for detecting leakages which is unique, and borders on the comical. As is well known, the odours of coal gas have a peculiar charm for the olfactory nerves of the *Muscæ domesticus* or common house-fly, and the blue-bottle or blow-fly. These charming "harbingers of spring" are never so happy as when inhaling the delightful perfume arising from a fractured main; and by their presence we are enabled to detect escapes which would be difficult to find by other means. We have one man in the Company's employ so expert in tracking the fly in this way, that he frequently finds six or eight leaks in a day. Of course, this means of detection is only available during the summer months.

While it is necessary to keep a sharp look-out for any breakages in our mains and services, we should also take every precaution to keep the apparatus in the works as tight as possible. It is our practice to paint the holders nearly every year, using for the bottom plates a mixture of well-boiled tar and Trinidad bitumen, heated and then thinned down with turpentine or benzol when cold. This mixture is laid on very thinly, and in a number of coats, and will eventually form a covering like enamel. For the sides and top we use burnt pyrites ($Fe_2O_3$) ground in raw oil. This is an excellent preservative for iron, and is at the same time very economical. I hope to show you some holders which have been in constant use for nearly fifty years, and which are still in excellent condition and practically gas-tight.

### PURIFICATION.

We are to have a paper on "Oxide Purification," which I know will prove of interest to many—especially country members, who frequently find a difficulty in procuring good lime for purifying purposes. In Ballarat, we use nothing but oxide, revivified *in situ* by the admission of a very small percentage of air discharged into the end of the foul main.

### CARBONIZING PLANT.

Passing from the purifiers to the retort-house, we come to that portion of the plant which more than any other is at the present time claiming the attention of many of our leading engineers in England and on the Continent. It has ever been perhaps the most fascinating subject connected with the industry. I remember well the wordy warfare which took place many years ago on the merits of the regenerator furnaces; Mr. Charles Hunt, the father of our esteemed Secretary, being foremost in the fray. One might truly say, in the words of Tennyson's King Arthur, regarding the retort-house, "The old order changeth, yielding place to new."

With the advent of the mechanical stoker, we naturally concluded some finality in retort charging and drawing was approaching. But not so. Evolution is still proceeding with rapid strides, and the innovations which have been introduced of late years would rather surprise those engineers of the past generation who pinned their faith to horizontal settings and light six-hour charges. Latter-day systems are rapidly changing the old methods of carbonization. The advent of the mechanical stoker marked the era of heavier charges with prolonged carbonization, and the ease with which these are handled calls forth our keenest admiration. But while the results obtained are highly gratifying, still further efficiency and economy are claimed by the use of the vertical retort. From the horizontal to the inclined, and thence to the vertical, seems a very natural method of upward progression; and it certainly looks as though it would prove so in the history of retort settings.

Gas engineers are busily engaged in testing the merits of rival systems which have lately come into vogue. We shall in future not be content with a yield of 10,000 to 11,000 cubic feet per ton, when by the use of vertical settings we can obtain from 13,000 to 14,000 feet, and probably higher. The Woodall-Duckham system is said to produce as much as 14,000 cubic feet per foot of retort per day, and the Dessau system, which is being largely installed in Germany and England, produces as much as 15,000 cubic feet per retort per diem, and a yield of 14,000 cubic feet of gas per ton. The results obtained by the best systems of machine-fed horizontal retorts are being surpassed; and mention may be made of some of the benefits which accrue from the working of these vertical settings. The advantages are summed up thus: "Low labour charges, low cost of repairs both as regards the retorts themselves and their very simple mechanical equipment, the high quality and superior density of the coke, and the almost entire absence of breeze, the satisfactory average yield, the purity, lighting, and heating value of the gas, the increased yield of ammonia, the thinness of the tar, and the avoidance of retort troubles resulting therefrom." It must be admitted that these form a goodly list. Whether a system of working vertical retorts suitable for small gas companies is likely to be evolved is a question that time alone can answer; but it is stated that the system is quite adaptable to medium-sized works.

The exigencies of the times demand that we should make as cheap a gas as possible; and with the advent of the incandescent burner and its very general adoption—the necessity for supplying so rich a gas as formerly, no longer exists. Berlin is generally credited with being one of the best lit cities in the world, yet the gas supplied is of low illuminating power—about 12 candles, with a heating value of 550 B.Th.U. Mr. Blair, the President of the North British Association, tells us, after his visit to that city; "All the requirements of the gas consumer are thoroughly well satisfied. Anyone who has seen the magnificent street lighting by gas in Berlin will admit at once that high candle power is not everything." And, he emphatically adds: "I have seen nothing to beat it." It is to be noted in this connection that the working of the vertical retort in conjunction with water gas is likely to prove most economical and efficacious. We remember the experiments conducted by Professor Lewes at Sydenham, in which he passed a percentage of blue gas into horizontal retorts. The scheme proved unsuccessful; but had he tried it with vertical retorts working under present conditions, the results would probably have been quite different. It is found that by the admission of steam alone towards the end of the carbonizing period in these retorts the yield of gas is increased considerably, with, of course, a reduction of illuminating power. The calorific value of the gas is, however, not much lessened.

### COAL SUPPLY.

What an anxious time the past few years has been to gas managers in Australia! While the price of coal has been steadily increasing, the quality has been coming down. We have had to take practically any coal that was offered to us. Now there are rumours current, however, that we have reached the high-water mark as regards the price, and that there is a probability of our securing cheaper coal in the near future. We may yet have to thank the Federal Government for something. Many gas companies are already forced to seek fresh fields from which to procure their supplies; and our hope for the future lies in the Maitland district, which possesses vast deposits of magnificent coal. I have lately been testing some samples in a small apparatus (iron retort), and in every case obtained a yield of over 13,000 cubic feet per ton, of high illuminating power. I trust it will not always remain a mystery as to why we cannot get these results on a commercial scale. I remember when it was common experience to obtain yields of 12,000 cubic feet per ton from some of our Newcastle coals—notably from the Stockton pit. Unfortunately, this mine is now worked out, and the output of good gas coals from Newcastle is very much curtailed. I think you will agree with me that the quality has deteriorated considerably of late years; and it is an acknowledged fact that it is only a matter of a very short time when the supply of really first-class gas coals from this district will cease altogether.

Well, gentlemen, it will not be the first time in the history of Australian gas companies that they have been forced to change the source of their coal supplies. It may interest you to know that at the inception of this Company, we had to procure our coals from England. Boghead cannel was largely used, and cost us about £3 per ton, landed in Geelong. Sometimes the supply was intermittent, and cargoes did not always turn up to time, when we had to fall back on anything that would yield gas. Gum leaves from the eucalyptus globulus, resin, butchers' fat, &c., &c., were some of the materials used. I wonder how many members present have charged a retort with resin? I can assure you it is an experience not easily forgotten. As the New South Wales coal and shale beds came to be opened up, we naturally obtained our supplies from these sources. So far they have served us well, and there are but few of us present who have not been very thankful that, apart from the good coal received from this district, we always had at hand the magnificent Hartley shale with which we could easily and quickly enrich the gas should the illuminating power fall below the standard. In changing from Newcastle to Maitland coal, we shall be faced with the difficulty of economically keeping the illuminating power down to a fair standard. It is easily seen how very suitable these coals should prove to those companies possessing plants for the production of blue water gas; and I am of the opinion that some of us will find it to be distinctly profitable to adopt some means for the purpose mentioned. British firms are now prepared to supply water-gas plants of very small capacity, producing 50,000 cubic feet per day upwards. Owing to the Maitland coals being practically non-caking, they should be admirably suited for use in vertical retort-settings.

### THE COMMERCIAL SIDE.

While we note evidences of great progress in all that pertains to the strictly technical side of the industry, it is becoming abundantly evident that the commercial side must be given more attention to than hitherto. It is the first duty of an engineer or manager to supply as cheap a gas as possible for light, heat, and power; but it is becoming more than ever necessary that he should endeavour, by every means in his power, to educate the public in its many uses. It is a bad policy to wait for them to come to us. We must go to them and literally carry on a crusade among our consumers—preaching the merits of incandescent burners, gas-cookers, grillers, gas-engines, and all modern paraphernalia pertaining to gas. If we do not do so, we need not be surprised to find that our electrical friends have charmed away some of our customers. We cannot shut our eyes to the fact that great progress has been made in electric lighting. I remember distinctly one of the speakers at a meeting of electricians held, I think, at Montreal many years ago, boldly stating that the industry need not expect to make much progress in domestic lighting as long as they had only the carbon filament to depend upon, and that unless something better were discovered, of which he saw little likelihood, the outlook for incandescent electric lighting was discouraging. This prediction was uttered before the advent of the Welsbach mantle; but things have altered since then. If the gas companies have to thank Welsbach for the introduction of the thorium mantle, electricity is surely indebted to him for leading the way in the production of metallic filaments, decidedly superior to the carbon lamp.

The osmium lamp is the progenitor of the tantalum and osram lamps; and it would be just as foolish for us to suppose that finality had been reached in the case of these, as to conclude that no further improvement would be effected in the incandescent gas-mantle. In the osram lamp we have a foeman worthy of our steel; but I think that if we take the latest product of electricity, and compare it with a good type of inverted gas-burner, we shall find the latter has a decided advantage. It is conceded that the osram lamp consumes 1·3 watts per candle power per hour; so that a 50-candle power lamp would use 65 watts per hour, and fifty lamps would require 3250 watts—equivalent to 3¼ units, which, at 5d. per unit (the present price in Ballarat for lighting purposes), amounts to a little over 1s. 4d. per hour. To obtain the same amount of light (2500 candles) from gas would require the use of 21 inverted burners, each yielding an illuminating power of 120 candles, and each consuming 4 cubic feet of gas per hour, or a total of 84 cubic feet, the cost of which, at 6s. 10d. per 1000 cubic feet, would amount to a little under 7d. So that electricity consumed in the osram lamp is more than twice as dear as gas in Ballarat. The first cost and fragility of the osram lamp are likely for the present to militate against its general use.

As regards arc lighting, in this city 10 guineas per annum for a 6 ampere lamp burning from dusk till 10 p.m. every night in the year excepting Sundays cannot be regarded as excessive; and it would be interesting to know how this compares with the charge made for the same power lamps (say) in London. One is inclined to think there is a great deal of missionary enterprise in such business.

### CONTROL OF BURNERS.

Electric companies in Victoria endeavour to keep every lamp under their own control. Is there any reason why gas companies should not do the same? I am satisfied that threequarters of the complaints of weak pressure, poor light, and the fragility of mantles could be prevented if gas companies undertook the maintenance of all burners. A wise manager does not allow consumers to attend to Lucas or other high-power lamps. He knows that, if this were permitted, they would in the majority of instances receive scant attention; and what holds good regarding high-power lamps is applicable to the ordinary household burner.

I make a point of going round the city during lighting hours, and have been astonished to find how negligent people are regarding the state of their mantles and burners; and I believe that they are not receiving on the average more than 50 per cent. of the light they would were these kept in proper condition. So impressed have my Directors become with the necessity for remedying the present state of affairs, that they have determined to undertake free of cost, the inspection and cleaning of all incandescent burners—supplying at a low rate any mantles or chimneys that may be required. By this means, we hope to bring every burner into personal touch with the gas official. The advantages to be gained on such a system of supervision becoming general are many. The Company would use their inspectors as agents to push the sale, and instruct the consumer in the use, of all kinds of gas heating and cooking appliances. At the same time, complaints would be remedied quickly, and the consumer would have every cause for dissatisfaction with his light or heating apparatus minimized as much as possible.

Surprise is sometimes expressed that gas is not more used in the country towns of Victoria for cooking purposes; but it must be remembered that, while the price is necessarily high owing to the great cost of coal and labour, fuel is exceedingly cheap. Six or seven shillings, or in some cases less, for a ton of wood is very little. Yet in Ballarat we have fixed over 500 grillers in the last two years; and I know that lately several other companies have been doing very well with their cooker business.

### AUTOMATIC LIGHTING.

It is pleasing to note the progress that is being made with automatic and distance lighting. The lighting and extinguishing of street-lamps by a small increase of pressure from the works is operating well in several places in Victoria; and when we are enabled to effect this without the aid of the pilot-light, a further advance will be recorded. Sentiment is a strong factor in inducing people to use electricity in private houses and hotels. It is certainly very convenient to be able to press a button and turn the lights on or off; and the electric companies make the most of this, if we can judge by the very explicit instructions they give to the consumers to always turn off the light when leaving a room. All this can be effected with gas by using electric or pneumatic switches now coming into use.

### INCANDESCENT LIGHTING.

It would appear, judging from statements made by Mr. T. Newbigging in his paper on the above-named subject, that the Australian gas consumer has adopted the Welsbach system of lighting much more extensively than his *confrères* in Great Britain. This Company have 3000 consumers on their books; and I think I am safe in saying that there are at least 20,000 incandescent burners in use. It is difficult to find a flat-flame; and it is doubtful if these amount to 5 per cent. of the whole. This is doubtless due to the high price of gas here compared with England. The improvements effected in inverted burners are gradually bringing them into favour with consumers. It is found that the inverted mantle has a longer life than the upright form, while the light is better and more economical. There has been no startling development in the mantle line lately, with one exception. The "Buisson Hella" or "Hella Bushlight" is a distinct departure from the ordinary kind of mantle. It consists of a number of filaments in the form of a brush fitted to a disc of hardened fireclay. The filaments are composed of paste of rare earths containing thorium and cerium, hardened by subjection to a temperature of about 2000° C. The filaments, which are fixed over a bunsen flame, are very strong, and emit a good light. The "Hella Bushlight" should prove valuable in places subject to much vibration. We may safely look forward to further developments in connection with high-power lighting, which has made great strides during the past year.

I know how imperfectly I have dealt with the subject-matters of this address, and have felt how impossible it was to even touch on topics of great interest to us all. This is an age of rapid change and quick progression in gas affairs, and all that we can do is to keep in touch and endeavour to adopt every improvement that will tend to cheapen and popularize the use of our illuminant. If we wish to possess the "land of promise," we must go forward, striving with all the knowledge that we possess to overcome the obstacles that will surely present themselves. I thank you for the patience and attention you have shown in listening to this address.

Mr. T. LORD (Geelong) expressed his pleasure in proposing a vote of thanks to the President for his very able address. He had brought forward a matter with which a number of the members had not been previously acquainted.

The HON. SECRETARY said he wished to second the motion. They were all very pleased to hear that the fly in Ballarat was only in the gas, and not in the ointment (laughter); and he felt sure it was entirely due to able administration and energetic management by their worthy President that this was the case. He had given the members some statistics which were not immediately connected with gas, but were of very great interest, especially to those who were "new chums" in the country. He had also touched on several matters, particularly carbonizing, in which they were all very much interested at present.

The motion was carried with acclamation.

The PRESIDENT thanked the members for their kind appreciation of his address.

### EXPERIENCES WITH OXIDE PURIFICATION.

Mr. J. LORD (Williamstown) then read a paper on the above subject. It will be found, with the discussion upon it, on p. 313.

### QUESTION-BOX.

The members then proceeded to deal with the contents of the "Question-Box." The various subjects submitted for discussion occupied the members for the remainder of the first and part of the second day of the meeting; and they will be noticed by us next week.

### ELECTION OF OFFICE-BEARERS.

The PRESIDENT said they had now to elect the President and officers for the ensuing year. In the ordinary course of events, they would have had as their President next year Mr. Thomas Lord, of Geelong; but the Council deemed it wise that there should be a break in the continuity of visits to the country. It was thought that members would prefer to pay another visit to Melbourne before they went again to a country centre; so it was deemed best to meet next year in Melbourne. For that reason, it was considered desirable to have as President a member who was resident in the city. Mr. Lord had very magnanimously agreed to the proposition; and the Council had therefore asked Mr. Holmes Hunt to become President for the ensuing year.

Mr. T. LORD (Geelong) said, in confirmation of his action in

standing aside, he had much pleasure in proposing that Mr. Hunt be President for the ensuing twelve months.

Mr. A. T. Frost (Beechworth) seconded the motion; and it was carried unanimously.

Mr. Hunt having acknowledged the honour accorded him, the following officers were unanimously elected:—

*Vice-President.*—Mr. T. Lord (Geelong).
*Member of Council (re-elected).*—Mr. D. Warren (Footscray).
*Auditors.*—Messrs. J. Bowman (Sale) and J. Lord (Williamstown).

The President said that while they had placed Mr. Hunt in the presidential chair, and had gained in that way, they would lose considerably in another; for Mr. Hunt's work as Hon. Secretary and Treasurer was worthy of their highest praise. They would miss him from this position, which was not one that many of the members would rush to accept. At the same time, he thought they had another excellent man for it; and the Council's nomination was Mr. C. W. Howlett, the Manager of the South Melbourne Gas-Works.

Mr. W. Swinburne (Melbourne) expressed his pleasure in proposing Mr. Howlett for the position.

Mr. T. Gale (Footscray) seconded the motion, which was supported by Mr. R. O. Thompson and carried unanimously.

### An Amendment of the Rules.

The President then called upon Mr. Hunt to bring forward a motion in regard to the rules.

Mr. Hunt said that experience of the last two years had shown that a flaw existed in the rules. When the President for the year vacated office, he was no longer a member of the Council; and it had occurred to him lately that this state of affairs should be remedied. He therefore wished to give notice that at the next annual meeting he would move the following addition to Rule 4: "The retiring President shall remain a member of the Council for two years immediately following his year of office." He said he thought it very desirable that the retiring President should be in touch with the Council during the time mentioned.

Mr. Thompson supported the suggestion.

After some discussion, it was resolved that the proposal should be acted upon forthwith, pending the passing of the resolution at the next annual meeting.

### Thanks to the President.

Mr. Thompson then proposed a vote of thanks to the President for his able conduct of the meetings and the affairs of the Association during the past year. He said the members were very much indebted to Mr. Figgis for the highly successful meeting, and it had been a great pleasure to them to see him in his sphere of activity as Engineer of the largest gas-works in the State outside Melbourne. He was pleased to think that, owing to the new rule just introduced, Mr. Figgis would be associated with the work of the Council during the next two years. He asked the members to carry the motion by acclamation. This was done, amid hearty applause.

The President, in returning thanks, said it had been a great pleasure to have the members at Ballarat, and to see so many at the meeting, which he felt sure must be productive of good. He thought that at such times they should endeavour to take away something which would be of benefit to them in the following year. Ballarat was a small place compared with Melbourne; but he did not think anyone could go into a gas-works, however small, without seeing something a little interesting and instructive. Men were differently constituted, and could not all see with the same eyes; but if they kept their eyes open, they might learn something even from those who were not so well situated as themselves. He had done his best to make the meeting a success.

The business then closed.

### Hospitality of the Ballarat Gas Company.

At the mid-day adjournment on the first day, the members were entertained at luncheon in the Town Hall by the Directors of the Ballarat Gas Company. Mr. Andrew Anderson, the Chairman of the Company, presided; being supported by Mr. W. H. Figgis, the Secretary. Mr. R. O. Thompson, in returning thanks to the Company for the entertainment given to the members, mentioned that the Chairman was not only Chairman of the Ballarat Gas Company, but was connected with the management of several other large concerns in Ballarat. He was also Chairman of the Ballarat School of Mines, which sent engineers and metallurgists to positions all over Australia, and indeed to other parts of the world, including Africa, Canada, and America. He congratulated the Company on its able administration; and referred to the high respect in which their Engineer was held by members of the Association. The Chairman, in responding, expressed the gratification of himself and his colleagues at meeting the members. Mr. W. H. Figgis also responded.

### Visit to the Ballarat Gas-Works.

As the Ballarat Gas-Works have so recently been described in the "Journal" in Mr. Maurice Graham's "Round the World" articles,* it is unnecessary to give any further description. The Engineer, Mr. S. E. Figgis, conducted the members round the works and explained the various portions of the plant. All the retort-settings are heated by regenerative furnaces—this system having been in vogue at the works for the past twenty years. The retorts are charged by means of scoops manipulated by an overhead travelling crane. Particular attention was paid to the gasholders and the paint used in covering them, consisting of tar and bitumen—a mixture the President has great faith in, and to which he referred in his address.

* See "Journal," Vol. CIII., p. 508.

### Visit to the Water Reservoirs.

On the afternoon of the second day, the members enjoyed a very pleasant excursion to the water reservoirs of the Ballarat Water Commission. Leaving the Gas Company's offices about noon, and accompanied by Mr. A. Fraser, the Secretary to the Commission, the party drove into the hills, and inspected five reservoirs in which the Ballarat supply is collected—the total storage being 850 million gallons. The plantations round the reservoirs are quite a feature; and the Commission are gradually building up a considerable income from the trade done in timber. Planting of new trees goes on year by year. At Wilson's reservoir, about 14 miles from Ballarat, the party found awaiting them a luncheon spread in the shade of the pine trees. At the conclusion of the repast Mr. P. C. Holmes Hunt, the new President, proposed a vote of thanks to the Ballarat Gas Company for their kindness and hospitality, and to their able Engineer, the retiring President; and he said how much the members had appreciated the kindness of the Company, which, of course, was a great encouragement to an Association such as theirs. Not only had the Company been very hospitable, but they had granted the Association the use of their Board-Room in which to hold their meeting. He congratulated Mr. Figgis on the highly satisfactory year of office he had passed through. He also tendered the thanks of the members to the Ballarat Water Commission for their kindness in allowing them to inspect their fine water reservoirs. Mr. R. O. Thompson seconded the vote, which was heartily accorded. It was suitably acknowledged by Mr. S. E. Figgis and Mr. W. H. Figgis, and by Mr. A. Fraser on behalf of the Ballarat Water Commission.

## SOUTH METROPOLITAN GAS COMPANY.

### Half-Yearly Report.

The following is the report of the Directors of the Company for the half year ended the 31st of December, which, with the accounts [see p. 323], will be presented to the proprietors at the ordinary half-yearly meeting on the 10th inst.

1.—The result of the past six months' working must be regarded as satisfactory, since, notwithstanding a decrease of 1·7 per cent. in the quantity of gas sold, the profits allow of a dividend being paid at the rate of £5 6s. 8d. per cent. per annum—the full amount allowed by the sliding-scale—while the balance of £7371 carried forward is higher by £1496 than that with which the half year commenced.

2.—Several causes have contributed to the decreased gas consumption; the chief being the mildness of the weather in November and December, and the great number of unlet houses and properties in South London. Moreover, the economies attainable by the use of inverted incandescent burners have not yet reached their limit; and every endeavour has been made to bring them to the notice of the consumers.

3.—The expenditure on coal has been less, mainly by reason of improved working in the retort-houses, resulting in an increased make of gas per ton. To the same cause must be ascribed the greater yield of coke, though less coal was carbonized in its production.

4.—Despite this improvement, however, the return from residuals is £27,000 lower, mostly owing to the fall in the prices obtained for coke and ammonia. Tar has maintained its value; and the policy of taking over the manufacture of its products has proved a sound one. The loss on coke is largely the result of the depressed condition of the cement trade, in which about one-fourth of this Company's production was used last year.

5.—The use of gas for power and industrial purposes is increasing in popularity. The largest installation completed during the period now under review was at the Shad Thames pumping station of the London County Council, where gas is supplied to pumping-engines of over 1000 H.P.

6.—Save for the explosion last December in Grange Road, Bermondsey, and some accidents due to the use of water-slide chandeliers, coal gas has maintained its claim to be the safest as well as the cheapest illuminant. The Bermondsey accident arose from a cause which might have resulted in loss of life or limb had no gas or gas-pipes existed there. Mishaps with water-slide pendants continue to be a source of anxiety, notwithstanding the large quantity the Company have made secure; 8300 were altered free of cost to the consumer in the last half year, and they are now being converted at the rate of 1500 per week.

7.—The reality and sincerity of the attachment to the Company of its officers and men were never more strikingly exhibited than upon the mournful occasion when their last tribute was offered to the memory of the late Chairman; and no greater testimony could be afforded to his often-expressed belief that in co-partnership the Company and its employees have been truly united.

8.—Two Directors (Captain Thomas Bridges Heathorn and Mr. Frank Bush) and one Auditor (Mr. Charles Mortimer) go out

of office by rotation. They are all eligible for re-election, and offer themselves accordingly. Mr. William Henry Cupit has been elected a Workman-Director, in the place of Mr. Henry Thomas Manley.

709, *Old Kent Road, S.E.*, CHARLES CARPENTER, Chairman.
*Jan.* 27, 1909.

## EIGHTY-CENT GAS IN NEW YORK.

FROM AN AMERICAN CORRESPONDENT.

IT is a long time since the United States Supreme Court has given a decision so momentous to engineers, especially to gas engineers, as that dealing with the legality of the law under which, by a Lower Court, the Consolidated Gas Company were ordered to sell gas at 80 c. (3s. 4d.) per 1000 cubic feet. To English engineers this price may seem one that should enable the Company to make handsome profits; but when one considers the labour and coal conditions in New York City, the rate is one that does not permit of a fair surplus over manufacturing costs. In the Circuit Court, it was held that the law passed by the Lower Court was unconstitutional, because the 80 c. rate would practically mean, so far as the Company are concerned, a veritable confiscation of their property. When the case came before the Supreme Court, however, this decision was reversed; but it was done in such a way that it is possible to retry the case upon facts based upon experience in the management of the undertaking when working with the above-named rate. One of the most ridiculous phases of the contest was the view the Lower Court took on the subject of distribution; it being specified that the Company must maintain one pressure in their mains at all times. Several high-class engineering papers commented on this matter when the provision was called for by order of the Lower Court; and attention may be particularly directed now to this feature of the ruling of the Supreme Court.

The full text of the judgment has not been published, but the summary of it shows that, in matters of the valuation of a franchise, the Courts have gone back on the standpoint taken not many years back. The Supreme Court virtually concedes its approval of a return up to 6 per cent. on the actual value of the property; whereas in recent years it has been asserted that capital invested in such works as those of the Company was not entitled to receive more than 4 to 4½ per cent. in return. The Supreme Court makes it clear that, under conditions like these, franchises must be regarded as property upon which the owners are entitled to expect a fair return. In this particular, the decision gives useful hints on the valuation of franchises. The Court states that at the time of the consolidation of the Companies they agreed as to the value of these franchises; and this agreement was never questioned by the State until long afterwards—just about the time these proceedings were instituted. It was therefore decided that the valuation made when the Companies consolidated must be accepted as correct; but it was further held that the valuation of the actual property made during the trial in the Lower Court was open to question. Taken at the time of the consolidation, this valuation and franchise would now yield, on an 80 c. rate for gas, 5½ per cent., according to the figures of the Supreme Court. The Court then went on to rule that, under all the circumstances, the Company had failed to make out their case with the degree of clearness necessary to warrant the interference of the Court before an actual and *bonâ fide* test had been made under the practical operation of supplying gas at the rates mentioned in the Statutes. Considering the risks of the business and the locality, the Court further ruled that the Company were entitled, "if it is possible," to a return of 6 per cent. upon the fair value of the property actually used in their business. This "property" includes the franchises, but not any allowance for goodwill.

The decision is, of course, very much against the Company; and it seems to be a severe reply to the general political cry of William Jennings Bryan, "Shall the people rule?" The Company can, it is true, bring the matter before the Court again—after they have tried working under the 80 c. rate. It is almost like a case of committing suicide to see if it hurts! The only point directly in favour of the Company is the quashing of the ruling of the Lower Court in regard to one pressure being maintained; but this will not be any great concession if the Company cannot afford to put gas into the pipes at all. It is almost impossible to forecast just what will happen in the future; but, from the way in which the historic Standard Oil fine has been bandied about from Court to Court, without any decision being arrived at, it is safe to say that the Courts have not seen the last of the case against the Consolidated Gas Company.

**Coal in Kent.**—Information was received at Dover early last week that a new seam of bituminous coal 2 ft. 3 in. thick was struck on the previous Saturday night at one of the borings between Canterbury and Dover, in the areas of the Kent Coal Concessions group. The seam was struck at a depth of 1348 feet; being nearly 100 feet nearer the surface than any workable seam yet discovered in the Kent coalfield. A sample for analysis has been sent to Mr. G. R. Hislop, of Paisley.

## THE LATEST ADVANCES IN STREET LIGHTING IN BERLIN.

By Professor H. DREHSCHMIDT.

(*Concluded from p.* 244.)

IT has been already pointed out that the mean horizontal illumination in the Potsdamerstrasse with the high-pressure inverted gas-lamps, properly regulated, amounts to 25 lux instead of the 17·3 lux ascribed to it Dr. Bloch. Consequently, it is not merely equal to the illumination in the Friedrichstrasse, but is about 45 per cent. higher than the latter. Dr. Bloch has, however, rightly drawn attention to the impropriety of directly comparing the illumination in these two streets because of the difference in the positions of the lights. He has calculated, therefore, the illumination and current consumed per 100 square feet of road surface on the assumption that the flame arc lamps are placed similarly to the high-pressure inverted gas-lamps. Following this plan, and substituting the correct figures for the gas-lamps, we arrive at the following comparative values:—

| — | Alba-Carbon Arc Lamps. | High-Pressure Gas-Lamps. |
|---|---|---|
| Maximum illumination, lux | 132·3 | 149·4 |
| Minimum ,, ,, | 2·0 | 3·4 |
| Average ,, ,, | 23·1 | 25·0 |
| Consumption per lamp | 825 watts | 84·76 cub. ft. |
| Consumption per lux per 100 square feet | 0·455 ,, | 0·0427 ,, |

With the new high-pressure inverted gas-lamps which are now being installed, the total consumption of gas is lowered to such an extent that the consumption per lux per 100 square feet amounts to only 0·0328 cubic foot. This latter figure must therefore be taken for comparing the two methods of lighting. In the same conditions the mean horizontal illumination is not, therefore, 33 per cent. higher with the flame arc lamps than with the gas-lamps, but about 7 per cent. lower; and the uniformity of the illumination is not a trifle better, but considerably worse. With the same disposition of the lamps, the vertical illumination by the high-pressure gas is also higher in the same proportion than with electric light. Consequently, the flame arc lamps must be suspended at a greater height if it is desired to secure the same uniformity of illumination that gas lighting affords; but in that case the average value of the horizontal and vertical lighting becomes still lower compared with that obtained with gas lighting. Dr. Bloch holds the view that lamps of 3000 hefners (say, 2700 candles), even if their dazzling effect is considerably obscured by the use of opal glass globes, as in the case of arc lamps, ought to be suspended at a greater height than 18 feet, in order not to dazzle passers-by. The author, however, thinks that the height of 18 feet is adequate provided that the passer-by is regarding the traffic of the streets and not specially looking at the lamps themselves. But the dazzle of flame arc lamps with Alba-carbons, even with the translucent opal globes used with them, is very great and much more than that of the high-pressure gas-lamps. It may therefore indeed be requisite that the electric lamps should be placed at a greater height. But, as already pointed out in regard to the arc lamps which were tried on the Gertraudten Bridge, the Berlin Electricity Works does not appear to agree with Dr. Bloch's views as to the necessity of putting the arc lamps well above the line of vision. Dr. Bloch, moreover, is wrong in supposing that the high-pressure gas-lamps cannot be placed at a greater height having regard to the necessity for access to them for cleaning and renewal of mantles, &c.

It may be pointed out that at Stuttgart there has been an installation of these lamps in use for some time at a considerably greater height; but the vertical illumination, which is very important, suffers if the height of the lamps is increased. At the greater height of suspension of the flame arc lamps—namely, 23 feet—the mean horizontal illumination is not 25 per cent. better, but 13 per cent. worse, than with gas lighting; but its uniformity is somewhat greater. It is obvious that at a greater height of the lamps, high-pressure gas gives a more favourable result in regard to average illumination and uniformity than electric lamps placed at the same height. The intensifying flame arc lamps, when placed at a height of 23 feet for the sake of securing uniformity of illumination, gave, according to Dr. Bloch, almost as great an illumination as the Alba-carbon arc lamps—that is to say, the mean horizontal illumination from them was about 17 per cent. less than that from high-pressure gas-lamps at a height of 18 feet, while the degree of uniformity of the latter mode of lighting was not quite attained.

The Berlin Electricity Works has followed the principle generally recognized in business, of selling at a lower price for public use. It has lately lowered its price for current for public lighting from 1·9d. to 1·5d. per B.T.U. The low price serves the purpose of attracting attention to electric lighting; but the private consumers have, on the other hand, to pay a much higher price. For instance, in Berlin the price of current to private consumers is 4·8d. per unit. In certain very special conditions, which are not available for the majority of consumers, current is obtainable at 1·9d. per unit. The gas-works are impelled in their own interest to follow the same principle; but Dr. Bloch, in his comparison of the relative cost of gas and electric lighting, has taken figures which, for electricity, are practically based on the extremely low

price of current for public lighting, but, for gas, are based on the price at which it is is available to private consumers. He has taken a consumption of gas of about 0·0656 cubic foot per lux per hour per 100 square feet; but the latest results show a consumption of only 0·0328 cubic foot per lux per 100 square feet. For the flame arc lamps, he has taken similarly a consumption of 0·557 watt per hour per lux per 100 square feet; but it has been shown that this consumption should be increased to at least 0·743 watt per lux per 100 square feet, on account of the necessity of using opal globes. The improvement in gas lighting on the earlier conditions is discussed by Dr. Bloch with reference to the average illumination of a horizontal surface, and is not 2½ times, as he made it, but 5 times; while the flame arc lamps do not show an improvement over the ordinary arc lamps of 2·7 times as he indicated, but only about twice. Consequently, the inverted high-pressure gas-lamps show a far greater advance over earlier methods of gas lighting than the new flame arc lamps do over the old arc lamps.

In regard to the cost of attendance and renewals by the new methods of lighting, Dr. Bloch excused himself from making an exact comparison, on the ground that he had not the necessary data in regard to gas lighting; but he should at least have been able to give exact figures for the new electric arc lamps. He, however, only assumed a certain cost of renewals and attendance for the latter. According to figures ascertained by the gas-works, the cost per burning hour of maintaining the new high-pressure inverted gas-lamps when they are alight all night amounts to 0·29d. This sum includes attendance, mantles, and all other renewals. There is, further, the cost of compressing the gas—namely, 0·7 pf. per cubic metre (2·38d. per 1000 cubic feet), which includes depreciation charges on the plant and all subsidiary costs, which, it may be remarked, would be reduced with an enlargement of the installation. A high-pressure inverted gas-lamp of the latest type consumes only 1850 litres (65·33 cubic feet) in place of 2400 litres (84·76 cubic feet) which was taken as the basis of the earlier calculations. The compressing charges per burning hour therefore amount to 0·15d., and the total auxiliary costs to 0·29d. + 0·15d. = 0·44d. Referring this to the total consumption of gas, and adopting Dr. Bloch's assumed price of 9 pf. per cubic metre (2s. 6½d. per 1000 cubic feet), it will be found that the auxiliary charges are equivalent to 22·3 per cent. of the cost of gas consumed. Taking into consideration the reduced gas consumption, the net cost of gas will be 0·09 pf., and the total cost of lighting by inverted high-pressure gas-burners therefore 0·11 pf. (0·0132d.) per lux per hour per 100 square metres, instead of the 0·234 pf. (0·028d.) arrived at by Dr. Bloch.

Assuming the current to be at the low price of 1½d. per unit, and the consumption per flame arc lamp at 825 watts per hour, and the cost of attendance at the low figure paid by the City of Berlin—*i.e.*, £14 per lamp per annum (in other places it is more—*e.g.*, £16 10s. per annum)—the auxiliary charges per burning hour for the flame arc lamps with Alba-carbons amount to 0·914d. (or 1·0776d.), which is equivalent to 77 per cent. (or 90·7 per cent.) of the cost of current. Taking the consumption of current per lux per 100 square feet arrived at by Dr. Bloch, the cost of current would be 0·072 pf., and the total cost of electric lighting consequently 0·127 pf. (0·015d.), or, at the higher charges for service, 0·137 pf. (0·016d.) per lux per hour per 100 square metres. It will thus be seen that, even at Dr. Bloch's figures for the illumination obtainable from a given consumption of current in flame arc lamps, gas lighting is considerably cheaper than electric lighting, and that the cost of current must be reduced to approximately 1d. per unit in order to bring the cost to something like equality. The result would, of course, be much more favourable for gas if its price for public lighting were reckoned on the same basis as the cost of current. The price of 2s. 6½d. per 1000 cubic feet is higher than the cost price of gas in Berlin including distributing and rental charges to private consumers. The net cost price of gas for public lighting might be reckoned at about 1s. 4d. per 1000 cubic feet to make it comparable with the price assumed for current for public lighting. Actually, the gas-works might supply gas for such purposes at a still lower price if they had regard to the advantage which such advertisement would afford their product in its competition with electricity. This fact must be mentioned, because Dr. Bloch considers such advertisement legitimate from the business point of view in connection with electricity supply.

In conclusion, while generally agreeing with Dr. Bloch that both gas and electricity have made great advances in giving more powerful, and at the same time more economical, street lighting, the author would emphasize the fact that Dr. Bloch has regarded the advances of gas lighting too unfavourably. Moreover, it cannot be admitted that the advance shown by the flame arc lamps with Alba-carbons over the ordinary arc lamp is greater than that of the high-pressure inverted gas-light over the earlier descriptions of gas-lamps. As a matter of fact, the opposite appears to be the right view. The author hopes that the figures given by him will supply the necessary data for the comparisons at which Dr. Bloch was aiming.

The author is gratified to be able to recognize that Dr. Bloch has endeavoured to judge the two competing methods of lighting as far as possible on a fair basis. But, unfortunately, the same has not always been the aim of others more or less intimately associated with him. It would be well if other electricians adopted his standpoint. In the number of a monthly pamphlet issued by the Berlin Electricity Works (for November, 1908), attention is drawn to the fact that consumers who guarantee a minimum consumption of current per annum between the hours of 10 o'clock in the evening and 7 o'clock in the morning amounting to not less than £25 worth, may obtain the current consumed within that period at the rate of 1·9d. per unit. It may be remarked that this reduced tariff will be chiefly taken advantage of by hotels, restaurants, and cafés, who in any case would prefer electric lighting apart from economical considerations. But the data already quoted by the author show that gas can compete successfully with the arc light, even when the price of current is as low as 1·44d. per unit. Ordinarily, however, it is not the arc light, but the electric glow lamp, that comes into competition with the ordinary inverted gas-burner. Even the metallic filament electric glow lamps, which have the smallest consumption of current, stand far behind the ordinary inverted gas-lamp in respect of economy, even when the very high price of these electric lamps is left out of account and current is taken as obtainable at 1·9d. per unit. The ordinary inverted gas-lamps consume about 0·03 cubic foot per candle mean hemispherical illuminating power; the metallic filament lamps consume 1·1 watt per candle, though there is some doubt whether this consumption actually refers to the hemispherical illuminating power. At the ordinary price of gas in Berlin—viz., 3s. 6d. per 1000 cubic feet—1000 candles with the ordinary inverted burner, therefore, cost 1·3d.; whereas with current at 1·9d. per unit, 1000 candles from metallic filament lamps would cost 2·1d., or over 60 per cent. more.

The Hildesheim Electricity Works, the lessees of which are closely connected with the private company supplying electricity in Berlin, have issued, for the purpose of attracting customers, a circular, in which they make the following remarkable statement: "The superiority of electric lighting rests not only on its enormous economy, but also on its freedom from danger in comparison with gas lighting. There are none of the accidents or risks of which gas poisoning, explosions, and fires are the most important, but in which must also be included vitiation of the air through the consumption of oxygen and the emission of carbonic acid. The vitiation of the air by a gas-burner is equivalent to the presence of four persons, and gives rise to permanent injury to health. It is by no means easy to improve by ventilation the air thus vitiated; for, apart from the waste through loss of heat by the exchange of air, carbonic acid is heavier, and is only drawn off at the last."

In an article in the "Gerstenbergschen Zeitung" of Hildesheim, for Sept. 29, 1908, for which the reporter doubtless obtained his information from the local electricity works, the advantages of mercury vapour lamps and flame arc lamps are put forward, and then the article proceeds as follows: "According to data given by the Berlin Lighting Committee, the small type of high-pressure gas-lamps employed there consume 44 cubic feet, and the large type 88 cubic feet of gas per hour apiece. The compressing is done by means of special motors and pumps. With gas costing 3s. 5d. per 1000 cubic feet the cost per lamp per hour would be 1·8d., or 3·6d. The flame arc lamps, which have about the same value, consume about 2 units in six hours, and taking the price of current at 2·4d. per unit, the cost per lamp per hour would be 0·8d. But for tramway lighting, the town of Hildesheim pays only about 1·2d. per unit; so that, for public lighting, the cost of these new electric lamps would be only about 0·39d. The cost of working the gas compressing pumps and renewal of mantles must make the maintenance charges for the gas-lamps about the same as similar charges for electric lamps. In Berlin, the conditions are peculiar in this respect, that the town owns the gas-works, while the electricity works are in private hands. The Municipal gas-works, in conjunction with the older Gas Company, supply the whole of Berlin with gas, and, apart from the latter, pay over to the municipal chest a profit of £20,000 to £25,000; while the Gas Company pay £35,000 to £40,000. On the other hand, the Berlin Electricity Works, which are restricted to one section of Berlin and, owing to their concession ending in 1915, are working at their maximum capacity, contribute about £250,000 to the municipal chest. The Municipality will not increase the value of the electricity works, which it will ultimately take over, by favouring an increase of capacity, and so does not extend the use of the comparatively dear current for street lighting purposes. This explains the relatively small extension of street lighting by electricity in Berlin as compared with many other large towns. High-pressure lighting, regarded from this standpoint, is an expedient of the Municipality to get over the interval between now and 1915, when the electricity works will be taken over or a new contract made with them. Obviously, these special conditions which prevail in Berlin do not apply to other towns."

The author thinks no comment on the foregoing quotations is necessary beyond the mere statement of the fact that the report of the Berlin Municipal Gas-Works for the year 1906 showed that the total profit handed over amounted to £382,487, instead of from £20,000 to £25,000. Bearing this misstatement in mind, readers may be left to form their own conclusions on the other points raised in the article quoted.

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We regret to learn that Lord Rayleigh, the Chief Gas Examiner for the Metropolis, who left England with Lady Rayleigh for a six months' tour round the world, has been seriously ill in South Africa. Though happily he is now better, he has given up all thought of going to Australia, and will probably finish the winter in Egypt.

# EXPERIENCES WITH OXIDE PURIFICATION.

By J. Lord, of Williamstown.

[A Paper read before the Victorian Gas Managers' Association.]

It was during the boom-time in the eighties when I first commenced to use oxide for gas purification. At that time we, like other gas-works in existence then, had to extend our plant so as to meet the increasing demand for gas. Among other plant, we purchased a set of four purifiers, 11 ft. by 9 ft., to replace a set of two purifiers, 8 ft. by 8 ft., in which, for some time, we used lime for purifying; and we found it necessary to change a purifier about every four days. It was in 1889, without any previous experience, that I first charged the new purifiers with oxide. The oxide first used was from Tasmania; and it was prepared by adding water sufficient to bring it to about the same amount of moisture as I had employed with lime—in other words, when squeezed in the hand the mess would stick together. I put two tiers of grids in each purifier, and from 10 to 12 inches of oxide on each grid. My first purifier fouled in about eight weeks' time, my second about six weeks after the first one; and I can assure you I thought I was doing famously only changing a purifier once in seven weeks, instead of every four or five days.

I worked on these lines for a considerable time, except that I gradually increased the depth of oxide on each tier to about 15 or 16 inches. But after a while, I found that my purifiers were not lasting as long as usual—in fact, it came at last that one purifier fouled in ten or twelve days. When I opened a box I found that the oxide was only discoloured for about 8 or 9 inches from the sides of the box, and the material in the centre was not affected at all. The next box changed was the same. After that, when I changed a purifier I always rammed the material tight for a width of about 4 inches around the sides of the box; and this seemed to remedy the evil. This practice I still follow.

I worked on these lines until about 1892 or 1893, when I read about admitting air to revivify the oxide while in use. But how to get the air in in the right proportions was a difficulty to me. I conceived the idea of using a wet meter to work somewhat after the style of a power meter, with this difference—instead of having weights to drive the meter I connected it by a series of bevel wheels to the pinion wheel on the drum-shaft of the station meter; and I geared it so that it would pass 2 per cent. of air to the quantity of gas measured by the station meter The outlet of the air-meter was connected to the gas-main between the first and second condensers; but it turned out a failure.

Incidentally, I may say that I was greatly troubled with naphthalene on the works at that time, which caused heavy back-pressure and often total stoppages, compelling me to abandon my first attempt to introduce air for the revivification of oxide while in action. I may here state that I use a "Körting" steam-jet exhauster fixed in front of the first condensers, and came to the conclusion that it was the cause of the naphthalene trouble. So I removed my exhauster from one place to another (at different times), until I eventually fixed it behind everything except the purifiers, and erected a condenser or cooler between it and the purifiers, to take out the steam before entering them. I have never seen naphthalene on the works since then—that was about the year 1894.

My next trouble was caused by the oxide on the bottom tier getting wet and cloggy to a depth of 4 or 5 inches on the grids; and several times I had to take it out on account of the extra back-pressure it caused. Well, I commenced to battle with it to try and see if I could remedy this defect. First of all I tried two or three folds of open hessian cloth laid on the grids, thinking it might help to drain the water out of it. But it was a failure. I then tried cocoanut matting, with no better results. Then I tried coke breeze with the fine dust taken out of it. I put breeze to a depth of 3 inches over the grids first and the oxide on top of it, and found that it was a decided improvement. So in changing my next purifier I increased the depth of breeze, and the same with the next one, until I had put about 6 inches of breeze on the grids. This seemed to remedy the evil; I was seldom troubled with it afterwards.

After this I worked on comfortably for a while, and then turned my attention to the air question again; but this time on different lines. I admitted the air automatically by creating a vacuum at the inlet to the second condensers, and I found it to work very well. The amount of air admitted was between 2 and 3 per cent., and my purifiers would go for six or seven months; but I had to invariably change them before they were foul, on account of the material getting hard, and causing heavy pressure.

My next move was to try and prevent this back-pressure. I had an idea that it was possible to overcome the trouble by mixing some light material with the oxide, so as to keep it light and open. I commenced first with sawdust, and then with coarse sand; but neither was a success. Then I tried fine coke breeze I sieved the breeze with a quarter-inch mesh, and mixed about 10 per cent. in bulk of the fine breeze with the oxide. I found this a great improvement; and in the next box I increased the breeze to about 25 per cent., with still better results. I then again increased it gradually, until I now use equal quantities in bulk of fine breeze and oxide, thoroughly mixed together; and the result has been so successful that I have not changed a purifier on account of excessive back-pressure since 1898 or 1899.

The last time I changed a purifier (No. 1) which the foul gas entered first, worked for sixteen months before it showed any signs of being foul. This was after having served its two terms as No. 3 and No. 2, and then the difference in the pressure between the inlet of No. 1 and the outlet of No. 3 was about 8-10ths. Excepting on one occasion I have not put the material back a second time since 1900.

The quantity of gas made and oxide employed since I commenced using oxide for purification in October, 1889, up to the end of June, 1908, was: Gas made, 410,689,100 cubic feet; oxide used, 50 tons; or, 8,213,782 cubic feet of gas per ton of oxide.

*Discussion.*

The President (Mr. S. E. Figgis, of Ballarat) said they had to thank Mr. Lord for a very interesting paper. It bristled with good points that were useful to members.

Mr. A. Dumont (Warracknabeal) moved a hearty vote of thanks to Mr. Lord for his paper, which he said had been very interesting to him personally, as he had had experience with oxide not exactly on the same lines as those of Mr. Lord, though he had had trouble with the bottom tier. He followed the same plan with it as that adopted by Mr. Lord.

Mr. T. Lord (Geelong), in seconding the motion, said he knew years ago of the trouble his brother was having, and what he had done with his purifiers; and it was most pleasant to hear of his success, for, without doubt, what he had done was a success—a far greater one, indeed, than he (Mr. T. Lord) had achieved. He had worked on the same lines, or verging on them, as his brother. It must be a revelation to find that he was able to run his purifiers into the teens of months without opening them. It was one of the things a manager or an engineer could appreciate. In his own case, he had been pleased to be able to run up to ten weeks without opening the boxes. He had managed to do this until quite recently. Then he had a change of coal which caused him to open them in ten days. He had in use a coal which he imagined had a touch of Pelaw Main or of a Newcastle mine in it—both yielding particularly well in sulphur. He would strongly advise his brother to try it, and if he could run with the same coal as he (the speaker) had done for the last six or eight weeks without opening his purifiers for twelve months, he would earn double the credit he was now getting. He was using nearly the same quantity of breeze as his brother, and had also been availing himself of about 20 per cent. of small siftings off the clinker heap.

The President: Do you use air?

Mr. Lord said he did not. He had not tried the introduction of air in revivifying; but it was his intention to do so. He was very pleased at what he had learned from the paper, and could assure the members that he would endeavour to adopt it. He thought if a number of the members acted on the same lines, it would be of much benefit to them.

Mr. W. Ray (Engineer to the South Australian Gas Company), on being invited to make a few remarks, said he should like to ask Mr. J. Lord one or two questions. The first was what was his maximum make per day?

Mr. J. Lord: From 100,000 to 110,000 cubic feet.

Mr. Ray said he thought in this matter a great deal depended upon the retort, the size of the purifiers, and the mains. He should also like to ask Mr. Lord what became of the water. Where did the moisture go?

Mr. J. Lord said it simply ran through into the valves and out of the syphons.

Mr. Ray said many years ago he was troubled very greatly with moisture in the bottom tier. He could not very well put in breeze. A certain quantity of oxide fell through to the bottom tier, and when they put in breeze, the oxide went down with it. An ordinary condenser did not keep the moisture back; and he attributed this solely to the speed at which the gas was travelling in the condenser and to the size of the purifiers. With regard to back-pressure, they were not seriously troubled with it. In order to get a longer life out of the oxide, he sent home for one set of Jäger and one set of Spencer grids, and he thought they would in a large measure obviate the packing of the oxide on the bottom tier. The principle of both the Jäger and the Spencer grids was merely to distribute the gas in small units. He had not up to the present used air; but if he ever did so, it seemed to him that he should take it in at the hydraulic main. When he was in America some years ago, they had trouble in taking in air at any other place than the hydraulic main. Whether or not it became carburetted to any extent he did not know; but certainly the illuminating power of the gas was not diminished to the same degree as when they took in the air at the outlet of the condensers. He was specially interested in the subject of purification. Their maximum 24 hours' make last winter was 1,250,000 cubic feet; and they were passing this through eight 15 ft. by 25 ft. boxes, each containing two layers of oxide 12 inches deep. Their changes were about once a week. The whole question seemed to him really one of speed and capacity, and of the kind of coal used. Of course, those who had large purifying capacities could, he thought, use air with impunity if they looked after it carefully. But those who expected their makes to increase were those from whom it would be well to hear if they attempted it.

Mr. A. Cusa (Shepparton) said he had very much the same experience as Mr. Lord with reference to back-pressure. He found that by putting in about 6 inches of lime and breeze mixed, the material did not get into a dense mass as was otherwise the case. It might get very hard, but it was also porous.

Mr. A. KRUMMELL (Warragul) said his experience had been somewhat different from that of Mr. Lord. It was only a little more than twelve months since he commenced using oxide instead of lime—about one ton in each purifier. He did not use air. It was necessary to change his purifiers about once in every three months. He passed through one ton of oxide something like 600,000 cubic feet of gas before it was necessary to change. He had no back-pressure.

Mr. W. PERKINS (Horsham) remarked that he had very little experience with purification by oxide; it was mostly all lime that he was using. He would very much like to get a larger pair of purifiers, so as to be able to employ oxide. His were on a small site, and this, of course, caused him to change them often. During last winter he frequently had to do this three times in one week; but he generally managed to run a week, and sometimes, but not often, ten days.

Mr. W. PAIN (Bendigo) said he was circumstanced very similarly to Mr. Lord, but was using Abermain coal, which necessitated more purifying. His purifiers were 14 feet square. He used 7 tons of oxide in each box, with about 25 per cent. of breeze added in the bottom layer only, and found that it answered very well. It did not get hard in the bottom layers, and required opening only about once, on an average, in ten weeks. Three boxes were continually at work with two tiers—about 9 inches of oxide in each. They got on very satisfactorily, and there was no trouble whatever. The oxide on coming out of the purifiers was laid on an asphalt floor and ploughed up and split about every alternate day for revivifying. The breeze, of course, was screenings from the coke. They screened everything—selling to the blacksmiths the coarse breeze such as would go through a $\frac{3}{8}$-inch grid. The rest they used with the oxide in the purifiers.

The PRESIDENT remarked that they had just had the experience of a gentleman who was using rather a dirty coal—the Abermain—which certainly contained a larger percentage of sulphur than others. He should like to know from the author of the paper what coal he was using.

Mr. LORD replied that it was chiefly Newcastle coal.

Mr. E. B. LEE (Bairnsdale) said he was using oxide, but sawdust with it, to overcome the difficulty of the bottom clogging on the lowest grid. He put 3 or 4 inches of sawdust there, and found it absorbed all the moisture, and kept the oxide clean. He had no trouble whatever with oxide, and passed about 300,000 cubic feet of gas through it in a month. He did not use air, and changed his boxes about once in three months.

Mr. T. GALE (Footscray) said he used Abermain coal, and found it very good. In purifying they employed oxide of iron and breeze; but they used on the bottom tier always the dregs of the oxide. They did not put in fresh each time. Of course, they took out and turned over the material, and the dirtiest part went to the bottom. That in the top tier was always new. The moisture in the bottom was very troublesome to get over. One member had stated that he lifted the lid for a few hours. They dared not do this, or they would have the purifiers on fire. They were passing 130,000 cubic feet through the purifiers every 24 hours. The boxes were 12 feet square. They did not use air.

Mr. C. W. HOWLETT (South Melbourne) said it was hardly necessary for him to offer any remarks, as already in connection with a discussion which took place at a former meeting, he had expressed an opinion as to the best method of preparing oxide, and its results. The experience he had had might not be analogous to that of the members who had already spoken, as he had worked under altogether different conditions. Results depended upon the class of coal and oxide used; and the close oxide certainly required opening up with some material. Evidently coke breeze had been extensively employed. He had largely used sawdust, which not only opened up the material but helped to lighten it. Air undoubtedly prolonged the life of the boxes; but other things had to be taken into consideration. In course of time, sawdust no doubt took the moisture out of the oxide, and made it hard and difficult to deal with; and eventually it had to be broken up. When he had heard members talking about changing boxes in weeks and months, this was experience which, of course, they in South Melbourne could not have. Mr. Ray had aptly said it depended on the purifying area. If this was large, the material would certainly last much longer. A big pressure would sometimes cause excessive moisture—putting too much water into the oxide; and if they had not got it drained off nicely, there was bound to be trouble. Then again his experience was that in the dry the excessive pressure was rather due to the very dry nature of the oxide after the moisture had been driven off. He was pleased to hear the experience of the author of the paper, though surprised to be told that there was 50 per cent. of breeze and oxide mixed. While breeze when mixed went freer, it was not going to purify the gas; and he could scarcely realize that it would prolong life to a large extent, because it was reducing the area. He would like to try Mr. Lord's system; and if it rendered the boxes more durable, and prolonged life to anything like the extent mentioned, the experiment would pay them all.

Mr. R. BEARUP (Stawell) said he had lately left Hamilton and gone to Stawell, where they had very small purifiers and used lime. At Hamilton he had one purifier with oxide, and mixed this with sawdust. He had no trouble with back-pressure, but the purifier was rather small. He used to take out the oxide, even without its showing impurity, about once a month.

Mr. J. B. EARL (Lilydale) remarked that some years ago he had very much trouble with lime. He now charged the purifier with oxide, and found it a considerable improvement. He used to have to clear it every ten days; but now it ran for three or four months. He did not use anything with the oxide. He had a large purifier. It took nearly two hours for the gas to get from the retorts through the purifier.

Mr. A. CUSA (Shepparton) remarked that he always kept his eye on the oxide, even when the lid was on. Sunday was the day when he lifted the lid.

Mr. J. BOWMAN (Sale) said that at Sale they used nothing but lime, which was very cheap there; and they preferred it. No reference had been made to the elimination of the carbonic acid, which he considered a very important point in the purification of gas. By using lime they got rid of this impurity, and increased their candle power considerably. This was an advantage in Sale, where they had a number of gas-engines of from 60 H.P. to 70 H.P. going, and had to keep up the calorific value of the gas. He had had considerable experience with various qualities of lime, and found it best for their purpose. Their illuminating power was from 19·50 to 20·50 candles. In the early days they used Stockton and Hetton coal, but afterwards East Greta, which proved very satisfactory for some years. Now they had procured Hepburn coal; but he preferred Maitland. There was a great deal of sulphur in it, but the gas was of high quality.

The PRESIDENT said, with regard to the moisture, they in Ballarat had been using on the grids, before they put the oxide into position, spent tan, which he found held the oxide very well. The oxide was mixed with as rough a sawdust as they could get. There were two or three things the discussion had brought to light. The first was that in designing their purifiers they should have plenty of space; the second, that they should keep their oxide open as much as possible; and the third, that they should test their purifiers daily, without fail. The gas should be tested every day. With regard to the admission of air, he was sorry to see that some of the members had been afraid to use it. They in Ballarat had been employing it for some years. They had a small holder, and filled it with air, which was passed through a meter, and went thence into the end of the hydraulic main. He found there was no necessity to change the purifiers more than once in five or six months; and they had not bought any oxide for more than five years. They kept the illuminating power of the gas up to about 18 candles. He thought these results spoke for themselves. To those who had not yet used air, he would say, "Try it;" and he thought they would never regret it. The principal reason for changing, when they did change, was that the oxide caked hard in the bottom of the purifier. This he presumed was caused by the air gradually absorbing all the moisture present in the oxide. They all knew perfectly well that several endeavours had been made to moisten oxide in action, even by the use of steam. He had tried it; but if they found it only necessary to change the boxes once in four or six months, it was good enough, and oxide was cheap.

Mr. R. O. THOMPSON (Melbourne) said he had listened with great pleasure to the discussion, as he was the first to introduce oxide for gas purification in Victoria. The Metropolitan Gas Company of Melbourne had much trouble at that time, as they were using Stockton coal, which was full of naphthalene. The impression got about that oxide purification was the cause of the naphthalene; and in consequence they had great difficulty in continuing the oxide. He noticed a good many of the members were using steam-jets. This would account for continuous moisture, and for the oxide being dry; but even under ordinary circumstances the oxide had a tendency to become dry. There was not the slightest doubt that oxide was the cheapest method of purification; and as they had no such restrictions to contend with as existed in the Old Country, he should say it was best. In small works there was not such necessity to look to the pressures as in large ones. Some of the small works could close down sometimes at night. They had to consider these things in connection with the admission of air: There was always a little air getting in with the steam-jet; and this must be considered. But air was a very good thing to use, where it could be attended to, as the President had said. At the same time, one must exercise a little caution in very small works when putting air into the purifiers, especially when using the steam-jet exhauster. Mr. Bowman had given a very good reason why he did not use oxide. Lime with him was procurable at a very cheap rate.

Mr. J. LORD (Williamstown), in reply, said his object, when he commenced to take notes on using oxide for purification, was not mainly to test the relative value of the different oxides. He had the two purposes in view of doing away with the clogging and heavy back-pressure, and the trouble and waste of time in removing oxide and putting it back again. By remedying the first, he concluded he was taking the best means of obviating the second. As to moisture getting down to the bottom of the purifiers, on two or three occasions he tried dry oxide. When he took it out it was unaltered in appearance; it was white as it could be. He admitted the gas at the bottom. When first he tried it, he found a great improvement; so he put more breeze in the bottom tier, and since 1900 he had never had to take out his material on account of clogging.

The PRESIDENT said he was sure the members were all very pleased with the paper. Mr. Lord had thrown much light on an interesting question, and shown them how to work their purifiers without much trouble. He hoped they would accord him a hearty vote of thanks.

This was done by acclamation.

# COMMERCIALISM IN THE GAS INDUSTRY.

By Henry L. Doherty, of New York.

**[Extracts from a Paper read before the American Commercial Gas Association.]**

It is but a few years since it was the accepted belief of all gas men that money was made or lost in the retort-house. More recently they have commenced to realize that the opportunity for making money depends primarily upon the development of their market. While considerable attention is now given to the commercial side of our business, it is hardly probable that as much is devoted to this work as is warranted by its importance.

Increased sales of gas depend primarily on three factors, which I will endeavour to state in their order of importance: (1) Quality and quantity of commercial efforts; (2) quality of service; and (3) price of gas. The first depend largely upon the knowledge of the appliances to be had, and their relative merits; and knowledge of this character can be best disseminated by having periodical exhibitions. The quality of service depends largely upon the merits of the appliances used. Many gas men still believe that price is the determining factor in the sales of gas. In many branches of work, however, it can be readily demonstrated that it is easy to secure an improved efficiency in gas appliances which will do more to promote the sale of gas than any reduction in price that would be possible.

From this crude analysis we can readily appreciate the importance of periodical exhibitions which will directly acquaint gas men with the various appliances available that may contribute to the increased sales of gas; and indirectly these exhibitions will do much to augment the number and improve the quality of the appliances to be had. Competitive tests should be the logical outcome of periodical exhibitions, as they should do much to improve the quality of the appliances available. It has only been a matter of a few years since practically all gas was sold for illuminating purposes. Later we commenced to sell large quantities for cooking. Still more recently we have developed the industrial use of gas; and this field is probably of far greater importance than anything we now have in mind.

It is customary to compare the cost of gas and electricity on the basis of $1 per 1000 cubic feet for gas against 10 c. per kilowatt-hour for current. From the standpoint of economy alone, it has been only a few months since the incandescent gas-lamp was so greatly superior to any of the electric appliances which possess the same adaptability that it seemed unnecessary to have any greater advantage than the ordinary mantle lamp would yield. Recent improvements in electric appliances have, however, changed the situation materially. Disregarding the cost of lamp renewals both for current and gas, and assuming an average commercial efficiency of 20-candle power per cubic foot for gas and 1¼ watts for the tungsten lamp, the relative cost is now 5 c. per 1000 candle power-hours for gas and 12·5 c. for electricity. Or, stated differently, electric current at 4 c. is on a par with gas at $1 per 1000 cubic feet.

We should only fool ourselves were we to maintain that electric current for lighting purposes has no advantages over gas. As ordinarily installed, electric current is far more convenient and is more flexible in application; and this flexibility will permit a smaller quantity of light to yield the same illuminating efficiency as a gas-lamp of greater total illuminating quantity.

If an electric lamp is operated in close proximity to a light-coloured wall or ceiling, a dark spot will appear above the lamp on the wall. It is seldom that an electric lamp is installed in this manner; and therefore this discoloration is not often in evidence where electric lighting is used. A gas-lamp will produce it at a greater distance from the ceiling. It is an erroneous belief that the discoloration is due to smoke produced from the gas-lamp; and this has created the universally erroneous opinion that gas is less cleanly than electric lighting. The air is always laden with dust particles, and any source of heat will set up air currents. The impingement of a current in a given spot, whether produced by a gas-jet, an electric lamp, or a steam-radiator, will tend to cause a deposit of these dust particles against the ceiling or wall. It is quite possible to instal gas-lamps so that this discoloration will be reduced to a minimum, and be far less noticeable than that produced by a steam-radiator. It is also possible to convince the public that the discoloration is not dirt from the gas, but simply dirt from the air. The use of self-lighting gas appliances would overcome the greater convenience now enjoyed by electric lighting; and attention given to the protection of walls and ceilings against discoloration produced by gas-lamps would considerably lessen the advantage electric lighting now has over gas.

A greatly increased efficiency of gas lighting can be secured by mixing the air and gas prior to its introduction to the burner. Various forms of appliances are now on the market for this purpose; but none, so far as I know, are even reasonably practical. With piping of ample size, a considerable gain in efficiency can be secured by mixing the gas and air by means of a motor such as the drum of a wet meter, driven by the gas, and actuating a similar and larger drum, taking in a portion of all the air required for combustion. A gas and air pump of this character driven by a weight, similar in arrangement to that used for the manufacture of gas consisting of air carburetted with gasoline, will add still further to the efficiency of mantle lighting. Two such air-drums, driven by the weight of water automatically supplied, would probably have a very much greater efficiency than can be secured by piston pumps, would be free from the need of attention, and would give a constant supply of pre-mixed gas and air, at a pressure yielding the maximum efficiency. This is simply one example of the means readily available to gas men to re-establish the economic lead they formerly enjoyed over electric lighting; and it requires only the attention of some of our enterprising appliance makers.

I could, if I wished, go through the whole list of gas-using appliances, and probably find equally simple means of increasing their efficiency, and thereby their field of application. For instance, we have not as yet realized anything like the sales of gas we should enjoy for the heating of water for bathing and other domestic purposes. Of the present appliances used for this purpose, all are open to criticism. In my opinion, it is unwise for gas companies to encourage the installation of instantaneous heaters. In the long run, they will probably prove undesirable both to the customer and to the company. Through the head offices of the companies in which I am now interested, experiments are being carried on regarding the changes that should be made in hot-water reservoirs, the material used for their covering, and the changes in circulating water heaters to secure maximum economy. These experiments have progressed to a point which indicates clearly the necessity of preventing back-circulation of the water; and it is our intention to notify the manufacturers of gas appliances that as soon as one places on the market a heater properly equipped to prevent this, we will consider the purchase of no other form of circulating water heater. It is my opinion that improvements of this sort should emanate from the manufacturers rather than from the users of appliances. We, as gas men, are dependent for the development of our business upon the aggressiveness and progressiveness of our manufacturers. A specialist in appliances should always know more about the possibilities of improvements than the ordinary gas man. I have, however, frequently heard the appliance men complain that the gas men were inclined to be indifferent to their efforts for improvement. I regret to say that this criticism is not without merit. Incidentally, I wish to commend the National Commercial Gas Association men for establishing a closer relation between the manufacturers and the gas men.

It is to be regretted that so many gas men believe they are on a plane of greater excellence than the manufacturer of gas machinery and gas appliances. I cannot but believe that if we were to take the manufacturer of gas machinery and gas appliances into our family, make him feel there is no line of demarcation or distinction, and that he is necessary for our success and advancement, we should secure more from these men. On the other hand, if this class of labourers in the gas field were to exert themselves to do more for the advancement of the entire industry, I think they would find many men now operating gas plants who would be ready to show appreciation of their efforts.

At the last meeting of this Association, I had occasion to say that the commercial spirit had created the three "M's"—magnitude, manners, and methods. By our efforts to develop our commercial field, we have increased the magnitude of our business, we have improved our manners in dealing with our consumers, and we have materially bettered our methods both in handling our business and in the quality of our service. The delegates at this convention must represent a large number of men who are employed strictly in the commercial department. The work of the other departments largely influences the effectiveness of their methods. Almost every gas company now has a commercial organization, which can do much for the improvement of the other departments. The cost of manufacturing our products, where coal gas is made, is largely determined by the price we receive for our residuals. It is only a matter of time when I think the coke will be handled by the commercial department; and this is one field of work in which that department can make a definite showing of their capabilities.

This also offers another field of collateral gas appliances. The merits of coke-burning apparatus will largely affect the development of the coke market. We are constantly manufacturing more and more coke, and we must open up new fields for its use, either by increasing the number and efficiency of our coke-burning appliances, or by a reduction in price. Briquetted fuel has many advantages over ordinary fuel. Briquettes are successfully manufactured abroad, and command a market price far in excess of the cost of their production. In former contributions to conventions of this character, I have tried to point out the great benefits which can be secured by the cordial and hearty co-operation of the engineering, working, and commercial departments. By the development of the coke market to a point which will enable all this product to be sold at a higher price, the operating department will receive a benefit from the lesser cost of production. The briquetting of coke opens up a field for the use of this fuel, which will supplant other forms. Not only this, but if the binder used is coal tar, it lessens the amount of tar which must be marketed in the ordinary way. Tar has for a number of years been practically a drug on the market; and much of it must be burned to secure its disposal. Streets and roads may be treated with it under proper engineering direction, and rendered durable and dustless. In fact, no material is so desirable for road making, especially in view of the destructive action of motor-cars on ordinary roads. While the engineering department must solve the problem of road treatment with tar, the commercial department

is the one which can best arouse public interest in its use, and secure its universal adoption.

To those of you who are possessed of a truly commercial spirit, I want to present a few examples of what commercialism, in a broad sense, may mean to a gas company, though its value is often questioned by gas managers of the old school. The commercial department occupies a peculiar field between the organization of the company and its customers. Its influence on the managerial, operating, and engineering departments of a gas company may be a greater factor in their ability to handle the public than anything they can do directly. The commercial department must also excite our manufacturers of gas appliances to the exercise of greater interest and industry.

With no wish to embarrass the managerial, the engineering, or the operating department, it is only natural that the commercial department should have as a basis upon which to do service that which is good in all particulars. Low standards in both the candle power and the heating value of gas are hard to overcome; lack of uniformity in quality is still harder. Undue presence of sulphur and interruption of a service due to traps and naphthalene cannot but seriously interfere with the efficiency of commercial work. Without pressure from either the consumers or the commercial department, the operating and engineering departments are apt to be lax in some essential particulars. It is unwise for a company to reach a stage where this pressure must be exerted by the consumers. If a company is giving faulty service, the commercial department should strenuously urge improvements before the need for them reaches the stage when the consumers must take action. There is never a service so good but what it can be made better. The results secured by the men of the commercial department will depend largely upon their own ideas as to the true scope of their work.

## Shepherd's Bush in 1909.

The prospectus has been issued of the Imperial International Exhibition, 1909, which is to be held at the "Great White City," Shepherd's Bush. It is stated that, "the special feature of the exhibition will consist in the display of the most distinctive and unique products and manufactures in which foreign nations, their colonies and dependencies, and the British Empire respectively excel, so as to bring before the world for the first time the specialities of each country in a comprehensive and practical form, and to enable visitors to the exhibition to see at a glance the highest results of modern thought and energy in all the departments of Science, Art, and Manufacture of each nation. The effect of such an exhibition must be to impress upon every country the particular lessons it can learn from others, to increase friendship and good feeling between it and its neighbours, and to extend the commerce of all." The classification of exhibits embraces eighteen groups; among them being mechanical engineering, electricity, civil engineering, mines and metallurgy, and the chemical industries. In the mechanical and civil engineering sections, special effort is being made to assemble a good display of (among other things) producer gas plant and applications thereof to power-gas engines and industrial heating furnaces. Working exhibits of labour-saving and trade process machinery of as many kinds as possible, water and gas works equipment, lighting apparatus, and chemical process-plant and products. The President is Lord Strathcona and Mount Royal; and the Commissioner General, Mr. Imre Kiralfy. To the official information available, the "Daily Chronicle" adds that one of its most notable attractions will be an exhibition of the history of light for domestic use, from the earliest times to the present day. "The exhibition," it is added, "will be held in a large triangular building divided into halls. The public will enter at first into a small hall dimly illuminated by the most primitive forms of artificial light. Then they will pass into bigger halls, better lighted, according to the evolution of these methods, but still gloomy compared to the rooms of the present day. Each hall will lead into a greater one, until, passing through a gradual crescendo, as it were, of illumination, the public will arrive at the largest hall, where their eyes will be dazzled and delighted by the magnificent illumination which is provided by the most modern and brilliant inventions."

**England's Future Coal Supply.**—At a meeting at the Mansion House, on Monday last week, in conection with the British Science Guild, Sir William Ramsay dealt with the future of the coal supply of England. He stated that the report of the Royal Commission showed that our coal would not last more than from 500 to 800 years. Within 200 years the high prices of coal would render the conditions of living very difficult. There were only two other possible alternatives, he said—one to obtain a supply of heat in the form of steam by drilling a hole in the earth's crust at least 10 miles deep, which it was estimated would cost £5,000,000, and could not be accomplished in less than eighty years; and the other, which was conceivably at the disposal of the human race, would rest upon some discovery of a means of extracting energy from the ether, the possibility of which he regarded in the highest degree as remote. Sir William urged that the present generation should exercise thought for those to come by conserving the stores of coal existing in England; otherwise, in 200 years he foresaw a general emigration to other countries, and the decay of the industries dependent upon coal for their energy.

## MAKING A MARKET FOR COKE.

At the recent Meeting of the American Commercial Gas Association in Chicago, a paper on the above subject was read by Mr. R. A. Field, of Rome (N.Y.). In the course of it, the author made the following remarks.

In successfully marketing coke by modern methods, it matters little whether the first aim is to sell something that has not been sold locally before, or whether the object is to sell more of a commodity which has been sold to some extent, but at too low a price. In either event, the campaign straightens itself away into the fundamental proposition of educating the prospective buyer into first believing that he can use your product at all, and finally convincing him that he not only can use it, but that he is losing money, sacrificing comfort, and generally holding himself aloof from reasonable effort to avail himself of an opportunity to benefit himself if he does not seriously endeavour to find out whether you are really delivering the goods or merely amusing yourself by handing out a more or less convincing brand of hot air.

One of the first things to do is to get all employees of the company together in regular meetings, and lecture, talk on, or practically demonstrate the thing, until every one of them has caught the fever; and continue this until every one is burning coke and getting results. First of all know the thing you wish to sell from beginning to end, and you can confidently count on the earnest assistance of every employee to a man if your preparatory course has been properly supplied with energy enough to warm up the force. When this much has been accomplished, the very best of foundations for future operations has been laid, and that trait in human nature which makes a man want to impart what he knows and let some friend or relative in on the ground floor can be counted on to act like an endless chain, and your soliciting force soon becomes an army of educators. At this point the thing can be made to go on gathering momentum, or it can be practically killed; and at no time in the whole campaign does it depend so entirely on the one man who is acting as the main spring of the movement.

Every purchaser must be followed up, and the smaller the initial order, the more need of seeing that he is taught to use his first order properly. If he orders a ton, he has an investment large enough to make him persist in using it; and before it is gone he may learn how to regulate his firing and dampers until he gets good working results, where, if he has but a few bushels, there is small incentive to use his head to get him out of his difficulties. There is no advertiser like a satisfied consumer; and when you have followed him up until he becomes a repeater, it is only a matter of furnishing a uniform product and training the office force to respect his feelings and the man on the waggon to respect his property.

A plan which has met with great success was to follow up the start outlined above with "Coke Talks," explaining the nature of coke, its manufacture, various uses, good qualities, and the economies which could be, and were being, effected by its use. These talks were published in the daily papers; the idea being to bring out one fact each night, and to do it in one sentence containing the fewest possible words. At the end of the first winter season, marked results should begin to show, and the work should be vigorously pushed in the early spring, since many people contract for their fuel supply at this time.

Every furnace in the town should be inspected by a competent man—one who burns coke himself and who has a practical knowledge of how the fuel should be used to get results. A record of the make and size of the furnace, together with the number of rooms heated, should be secured at this time; and if the furnace is in any kind of shape, a card stating that the furnace has been inspected and found suitable for burning genuine gas coke should be tacked up in a conspicuous position near.

If the town has a regular market day, the rural vote can be rounded up by having a man go out among those who have driven into the town on such days, with a short talk and a booklet describing coke and its uses. In a great many instances, those who came in to take out a load of coal will take out their first order of genuine gas coke. This is the best kind of business, because the farmer rarely fails to make a success of coke burning, and in consequence he is almost sure to become a regular customer. He calls for and delivers his own coke, and he frequently goes into the fuel business on a small scale. We have several who started as outlined above, and now they contract for from 50 to 100 tons annually. They draw it when other work is slack, and always get it out of the way during the summer months when ordinarily it would be piling up in the yard.

This selling plan was worked out with the idea of getting the maximum net results—that is, business that would show consistent repeat orders, rather than that which would show large immediate results, with a big percentage of backsliders. Once the thing is fairly started, coke booklets, street-car cards, exhibits at local fairs, and donations of coke whenever you are forced to give something, all serve to keep the thing going. But the one thing that really counts is to know that every purchaser makes an unqualified success of burning your product. This means a whole lot of careful follow-up work, requiring considerable patient explaining of things which are simple enough to you, but which the other fellow fails to grasp.

One energetic, competent young man can look after all this work

in a town of 15,000 inhabitants, and have time enough to keep up his progress reports and do some other things. But he will not do it unless he is thoroughly systematic, fully understands the art of making a good game of the work, and is able to grasp the fact that the man in trouble ceases to trouble you and becomes your best friend just as soon as you realize that he is an opportunity.

## LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

The members of the Association met last Friday evening at the Cripplegate Institute, Golden Lane, E.C.—the chair being occupied by the PRESIDENT (Mr. W. J. Liberty).

### CONSTRUCTION AND ERECTION OF A ONE-AND-A-HALF MILLION THREE-LIFT GASHOLDER AND CONCRETE TANK.

The technical business submitted to the meeting consisted of a very lengthy paper by Mr. J. M. Campbell, of Luton, which dealt in detail with the construction of a gasholder and tank at the Devonport Corporation Gas-Works, in connection with which work he acted as Resident Engineer. A large number of drawings and photographs which the author displayed proved of much assistance to those present in following his remarks. A full abstract of the paper is already in type; but it is being held over until next week, so as to admit of the reproduction of such of the illustrations as are necessary to its proper understanding.

The PRESIDENT, in introducing the author, said that to Mr. Campbell (who was probably not known to all the members now), backed up by Mr. Walter Grafton, was due the inception of the Association. It was he who first of all wrote to the Technical Press inviting others to join him in forming a Junior Gas Association. There were seven replies; and these seven, he believed, were still with them. From such a small beginning, the Association had grown to what it was to-day; and under these circumstances it was a great pleasure to welcome Mr. Campbell among them.

When (after having been on his feet for about an hour-and-a-half) Mr. Campbell resumed his seat,

The PRESIDENT remarked that they had had a most exhaustive paper on the engineering side, the like of which the Association did not often have submitted to them. During their visits to different gas-works, the members would have noticed that a good many of the gasholders had been very small indeed; but it did not necessarily follow that because the holders were small the outputs were small. In their biggest gas-works, at Beckton, there were to be found a large number of "baby" gasholders—very small indeed, considering the magnitude of the operations carried on. One of the reasons why they were thus built was because of the wind pressure coming through from the mouth of the Thames, and another was because of the concussion from Woolwich while they were testing ordnance. But there was progression in gasholders as in other things; and they no longer found holders being built small because of wind pressure and concussion. Holders of a capacity of 10 and 12 million cubic feet were to be seen; and now they had a spiral-guided one to contain 3½ million cubic feet erected at the mouth of one of the most boisterous rivers—the Tyne. The latter holder, they learnt, had already been subjected to a wind pressure of no less than 52 miles per hour and 22° of frost. There was with them that evening a visitor who had had something to do with the gasholder and tank which Mr. Campbell had just described—he referred to Mr. J. W. Buckley, the Engineer to the Hornsey Gas Company. They were pleased to see him, and would like him to say a few words.

Mr. BUCKLEY said he was glad to be among them that evening, and could assure them that he would be only too ready to encourage the so-called juniors in any way that lay in his power. He was quite sure that he was echoing the opinion of everyone present when he said they had heard a description of a well thought out and well designed gasholder and tank; and they had also had the privilege of hearing (what was not always the case) the work excellently described by the writer of the paper. He (Mr. Buckley) became attached to the Devonport Corporation just at the time when the tank was nearing completion; and he came frequently in contact with Mr. Campbell while he was carrying out his work there. He felt that the Corporation were fortunate in having such a man to undertake the important duty of supervising the construction of the holder and tank. In fact, no gas company or corporation could have an official who would more thoroughly look after their interests than did Mr. Campbell at Devonport. With regard to the construction, he felt that very few of them could criticize it in any way—that was, to point out anything that had been left undone. Even, in their wisdom, the designers had made provision in one little matter that was not really required in the West of England. He referred to the anti-freezing arrangement which had been described. He had been in the West of England for some fifteen years; and during the whole of this time he had never seen sufficient ice to be able to skate on. There was so very little cold that the anti-freezer was not needed there; but then the designers probably were not so fully aware of the climatic conditions. However, if frost should come at any time, the anti-freezer was ready for it. He could confirm what had been said as to the extraordinary conditions with regard to the site, and the care that was taken in the construction of the tank. The tank was absolutely as "tight as a bottle." Provision had been made for a permanent supply of water; but after he (Mr. Buckley) had been at Devonport six months he cut it off. There had been no necessity to run any water into the tank since it was filled. After the holder was completed, the exhausting of the air that remained in the crown was very carefully accomplished. It took three or four days to do it; but they did not have the slightest complaint of any interference with the gas. The holder had been in constant work ever since; and there had not been any hitch whatever with it up to the time of his leaving, at the end of November last. Everything was most satisfactory; and all credit was due to the designers. While, however, admitting that the design was excellent, the careful supervision must not be forgotten; and he was sure that anyone requiring supervision of work of the important character of the Devonport gasholder and tank, would be very fortunate in having such attention given to instructions as had been the case there. The description they had heard read would form a valuable work of reference when it appeared in print. The time would come when many persons would look it up and read it, not only with pleasure, but with considerable benefit to themselves and to their employers.

The PRESIDENT proposed a very hearty vote of thanks to Mr. Campbell for his paper, which he said must have taken an enormous amount of time to prepare.

Mr. P. J. SMITHERS seconded the proposition, which was carried with acclamation.

Mr. CAMPBELL said it had given him the greatest possible pleasure to prepare the paper, as he looked upon the Association as part and parcel of himself. He was really the first person to suggest its formation; and, as the President had said, he had only seven replies to his proposal. Then he consulted Mr. Grafton, who brought the matter before his Polytechnic students; and so the Association came into being. Some mention had been made of the time the paper must have taken to write. Well, he spent almost every evening for about a couple of months on it; but he felt that the paper must be complete if it was to be of any practical use. Everything had been gone into. He thanked the members for the patience with which they had listened to him, and Mr. Buckley for his flattering remarks. It was always pleasant to hear that one's work was regarded as satisfactory—and particularly so when it came from the lips of such a man as Mr. Buckley, who could best speak as to the working, &c., of this gasholder and tank.

### SOME ANNOUNCEMENTS.

The PRESIDENT said he had received a letter from Mr. Milne Watson, the General Manager of the Gaslight and Coke Company, with regard to the recent visit to the Kensal Green Gas-Works. Mr. Milne Watson said that when the vertical retorts were completed and in operation, he would be very glad indeed if the Association would visit the works again. The next business meeting of the Association would be on Feb. 26, to hear a lecture by Dr. Samuel Rideal. The subject of the lecture would be "The Hygiene of Gas Lighting." It would be remembered that a visit had been planned to Woolwich Arsenal, to see Mr. Onslow and his high-pressure system. Unfortunately, this had fallen through; but at some future time, if they applied for permission to go over the Arsenal in the ordinary way, Mr. Onslow might be able to meet them, so that they could devote some time to the gas side. The visit could not, however, be carried out in the way he had thought—namely, for them to spend all the time with him. In place of this, their friends at Lea Bridge had kindly invited them to visit the works there on Feb. 13. Then on Feb. 20 there was to be a dinner at the Horseshoe Hotel, at which he hoped as many members as possible would be present.

### RESIGNATION OF THE SENIOR VICE-PRESIDENT—THE REVISED RULES.

The PRESIDENT next announced that Mr. H. Rothwell, through pressure of work, had felt compelled to resign the position of Senior Vice-President; and Mr. W. A. Barnett, the Junior Vice-President, had taken his place. The Council suggested that, as the session was so far advanced, it was hardly worth while just now bringing forward a new candidate to fill the position of Junior Vice-President. The annual election was quite near. Then as to the rules, the Council had revised these. They were being printed, and would be sent round to the members, for comment or amendment. It was intended that after Dr. Rideal had finished his lecture, the remainder of the evening should be spent in going over the rules and finally settling them.

### THE LIVESEY MEMORIAL.

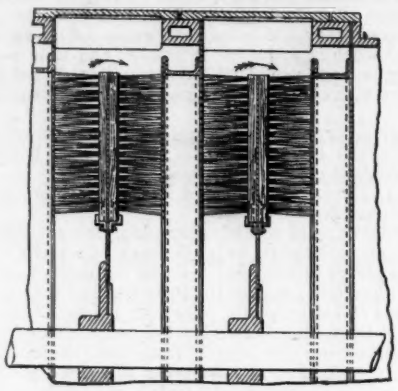
The PRESIDENT said that, with regard to the memorial to the late Sir George Livesey, the members would no doubt have seen that a sum of £10,000 was required to found a Professorship of Gas Engineering and Fuel at the Leeds University. Other Junior Associations were taking the matter up; and the Yorkshire Association had decided to open a fund for their own members, and send the proceeds up in the name of the Association. He suggested that the London Juniors should do something of the same kind. No particular sum need be fixed upon; but all of them who knew anything of Sir George Livesey, and what he did for the gas industry, would wish to contribute something. If they would forward their subscriptions to the Hon. Secretary, it might be possible to send them on in one lump sum to the Memorial Committee.

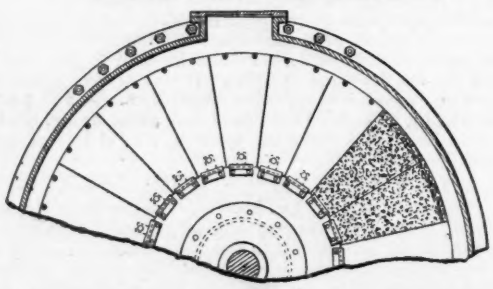
# CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

## Purification by Means of Ammonia.

SIR,—We notice in your issue for the 19th inst. (p. 155) a leading article on the revival of the purification of coal gas in closed vessels by means of ammonia, in which you mention the benefit accruing to such a process by the introduction of the improvement to the scrubber-washer mentioned in patent No. 28,387 of Dec. 24, 1907. We may say that our patent No. 7364 of March 26, 1902, covers the same ground, as the arrangement for the removal of our brush filling is identical with theirs. We enclose herewith two drawings showing our design.





With the experience gained in connection with the Claus gas-purifying process at Belfast, we are designing plant for the purification of gas in closed vessels by means of ammonia, in which our patent scrubber-washer with removable brushes will be used, and in which the liquor will gravitate from scrubber to scrubber; thus entirely obviating the loss of the ammonia which occurred at Belfast, due to the leakage in the pumps which had to be used for raising the liquor from scrubber to scrubber. In the process we propose, there will be only one lift necessary—that is, raising the foul liquor to the top of the carbonating tower, from which it will gravitate through the apparatus. This operation will be performed in closed vessels by means of compressed gas; thus avoiding any leakage of ammonia. We hope at an early date to lay this scheme before gas engineers who are interested in the process, as we see no reason why it should not be a commercial success when the operations can all be performed without loss of ammonia.

The causes of the failure at Belfast were: (1) Defective and badly designed plant; (2) unsuitability of tower scrubbers to perform the purifying process; (3) leakage of pumps which had to lift the purifying liquor from scrubber to scrubber. We venture to think that the plant we are designing will overcome all these structural defects, and can be operated at a low cost.

W. C. HOLMES AND CO.

*Whitestone Iron-Works, Huddersfield, Jan. 28, 1909.*

## Town Gas, Producer Gas, and Electricity.

SIR,—I appreciate the friendly criticisms of my contribution on the above subject, which are embodied in your editorial appearing with it in your last issue. I feel it incumbent, however, in view of some of your statements, to ask consideration of further points supporting my views, which appear to arise from your opinions as expressed in the editorial referred to. I might, perhaps, in the first place suggest that my article is not written "from the suction-gas point of view" alone, as the heading of your editorial implies. The only part of the subject with which I have attempted to deal where suction plants are concerned is that relating to cheap power in connection with which such plants have undoubtedly proved their efficiency and usefulness. I quite agree with you that gas manufacturers with service-pipes laid to engines working from these producers have found them a profitable source of consumption. Gas plants require a certain amount of regular cleaning; and with an alternative town gas supply, it is frequently cheaper and more convenient to do this during ordinary working hours than at week-ends. Meanwhile, the engine is run on the town supply. Then, again, the vast number of gas-engines—many of a large size—which have been put down since suction plants were introduced, make even a small demand of town gas per engine for such purposes as I have indicated quite a considerable item, in the aggregate, to the gas manager when he comes to take account of the matter. All these engines, however, would never have been installed but for the great economies possible by the use of suction-gas plants; so that in this respect your remarks give independent support to the claims I have made—that their introduction, far from being opposed to the interests of gas manufacturers, has been of the greatest service to them in one branch of their business.

As to electricity for domestic lighting, I know many men prominent in the town, gas industry who use it in their own houses in preference to gas, which is also available. May I, without offence, suggest that what is good sauce for the goose is usually considered good sauce for the gander also? I admit in my article that electricity for this purpose is beyond the average householder, on account of its cost. I also consider that the suicidal policy of many electricity undertakings which results in the lighting rates being kept high is a matter which in the best interests of the community is in every way to be regretted.

Then, again, if the great body of gas manufacturers are really keen to supply gas for gas-engines, as your remarks seem to imply, they might offer equal facilities for the renting or the hiring-out of engines to those which exist almost everywhere in connection with electric motors; and I specially commend this aspect of the matter to those concerned.

Lastly, my point of view may be what you term "circumscribed." Whose is not, more or less? But the real difference between us is surely this, that while I have attempted to take the three great branches of applied science represented by the title of my contribution, and to show how each may be fittingly applied in the interests both of the individual and the community, you are inclined to the view that I am not sufficiently alive to the scope of the gas industry—that I over-rate the success of producer gas; while one looks in vain through your remarks for any suggestion of usefulness in connection with electricity. My opinions as to the spheres of each may be partially wrong; but that they each have a sphere—and a great one—will not be denied by thinking men. Is it, then, so difficult to follow me to my conclusions, and more especially to that one wherein I suggest "that the highest future success with them—*i.e.*, the three branches named in the title—will be attained along natural lines of development rather than by a continuance of what is often a useless antagonism and an over-pressed competition"?

PHILIP W. ROBSON.

*Ashton-under-Lyne, Jan. 30, 1909.*

## "The Passing of the Lamplighter."

Under this heading, "The Times" last Tuesday contained an article dealing with the automatic lighting and extinguishing of public lamps. In the course of it, the writer said: "The old method of lighting and extinguishing street lamps by hand is, at its best, a crude method of doing the work, and compares unfavourably with the ease of manipulation which characterizes the electric light. Many attempts have been made from time to time to dispense with the lamplighter; but he still remains a familiar figure in our streets. There are reasons, quite apart from the desire to compete with electric lighting, why gas companies should desire to dispense with the slow process of lighting and extinguishing lamps one by one. The agreements which the companies have with local street authorities stipulate that the whole of the street-lamps should be lighted by a certain time, which varies with the season of the year; and it is clear that this can be achieved only by having many lamps lighted at what is an unnecessarily early hour—the period over which the lighting operations extend being generally one hour. It follows from this that if the whole of the lamps in particular districts could be automatically lighted at the same time, it would effect an appreciable saving in the consumption of gas; and the same reasoning applies to the extinguishing process." After referring to the results obtained by the Rostin apparatus, 800 of which are to be put into lamps in the Lambeth area, and to experiments now being carried out by the Gaslight and Coke Company with the Tourtel and other systems, the writer concluded: "While the extension of this system of control would abolish the lamplighter as far as the duties with which the public are most familiar are concerned, his employment would still be necessary for the purposes of cleaning the lamps and replacing broken mantles. It is the opinion of those intimately associated with gas street lighting that the inverted incandescent system will, in the future, be almost universally employed for both high and low pressures."

**Waste of Water in Manchester.**—At the last meeting of the Water Committee of the Manchester Corporation, statistics were presented showing that during the month there had been a great waste of water. The average daily quantity drawn off had been 40,832,048 gallons—an increase of 2,487,968 gallons per diem compared with the corresponding period last year. A large proportion of this is attributed to burst pipes following the recent frosty weather, and the subsequent waste. It was also stated that the consumption in the area supplied by the Corporation has increased in the past 14 years by more than 12 million gallons per day.

**Appointment of Foreman at the Devonport Gas-Works.**—Considerable correspondence has taken place in the local newspapers respecting the appointment of a foreman at the Devonport Corporation Gas-Works. The Gas Committee advertised the vacancy, and received a large number of applications, from which they selected three candidates to appear before the Town Council. One of these was J. Pryor, who had occupied a position in the retort-house at Devonport and who received the appointment. Mr. J. H. Bishop, an active member of the Gas Committee, in writing to the papers about the matter, contends that the position ought to have been given to a thoroughly qualified mechanic, and says that before the vacancy was advertised the Gas Engineer (Mr. W. P. Tervet) had informed the Committee that there was no one at the works qualified for the post. Among the replies to this communication was one from Mr. R. D. Monk, a Labour representative in the Council, who said that when the applicants for the position were before the Committee no questions were asked as to their qualifications as mechanics or anything else; and that as it was the duty of the Committee to see that the applicants who came before the Council were qualified, the Council had a free choice as between the three who appeared before them.

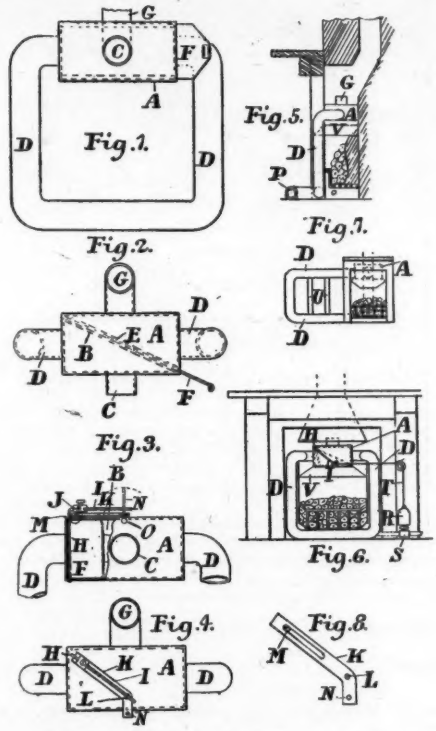
# REGISTER OF PATENTS.

## Gas Heating-Stoves.

HEDGES, K. W., of Cranley Place, South Kensington, S.W.

No. 410; Jan. 7, 1908.

This invention has for its object the utilization of the heat of the products of combustion for increasing the heating capacity of gas-stoves in which the products of combustion may be diverted from the flue-pipe by a valve and caused to travel through a pipe, or system of pipes, and ultimately gain access to the flue-pipe, whence the cooled gases escape to the atmosphere by the chimney. The proposal is to interpose a chamber or box between the stove outlet and the heating pipes and main flue, in the diagonal wall of which box a valve is provided to cut out the heating pipes or the like and connect the outlet direct to the flue—means being provided whereby the position of the valve is indicated, and in some cases arranged to govern the position or operation of the gas regulating valve.




Killingworth-Hedges Gas Heating-Stove.

Fig. 1 is a front view and fig. 2 a plan of a pipe system suitable for attachment to an ordinary self-contained gas-stove. Fig. 3 is a sectional elevation, and fig. 4 is a plan of a valve operating and indicating mechanism. Figs. 5 and 6 illustrate the application of the invention to a gas-fire in an ordinary grate. Fig. 7 shows the invention applied to a nursery gas heating-stove and arranged for airing or drying articles of apparel. Fig 8 is a detail.

In figs. 1 and 2, a box A, formed with a diaphragm or diagonal wall B, is connected at C to the outlet of the heating-stove, and provided with a continuous pipe D connected at its ends to the box at opposite sides of the wall. The diaphragm or wall is formed with an opening E, closed by a sliding plate F, which serves as a valve to establish direct communication between the outlet and the flue pipe G, or to divert the flow of heated products of combustion through the pipe system D to the flue-pipe. When the fire is first lit, the products of combustion escape for a short period direct to the flue; and when the fuel has become incandescent and a good draught has been created in the flue, the products may then be diverted through the pipe D.

To clearly indicate the position of the valve, the valve-operating mechanism is preferably fitted with an indicator, such as is illustrated in figs. 3 and 4. In this case, the valve-plate F is hinged or pivoted at H and provided with an external arm I, which has adjustably fixed thereon a block J. A lever K is pivoted at L upon the box A, and is formed with a slot (fig. 8) in which a pin or stud M on the underside of the block is free to work. The other end of the lever is formed with a hole to receive an indicating finger N, which is pivoted to the box at O. Thus the finger N serves both as an operating as well as an indicating device.

Referring to figs. 5 and 6, the box A is fitted above the gas-fire and provided on its underside with a hood V communicating with the interior of the box, and the pipe circulation D is arranged so that its sides are adjacent to the cheeks of the fire-place. The pipes in this case are of a shape in section and ornamental in appearance to conform with the general design of the fire place or stove. The lower part of the pipe may be fashioned as a curb, as shown at P, and may be used for drying or warming articles. This type of the invention shows a device for operating and indicating the position of the valve as well as ensuring that the valve is open direct to the flue before the gas-cock can be opened and the fire lit. This may comprise a bell R adapted normally to enclose the gas cock or regulator S, and connected by a cord or chain T with the valve arm I. The bell is preferably of a weight that will just counterbalance the valve, so that it will remain in the position in which it is placed, and the valve will not accidentally close the direct communication with the flue.

Fig. 7 shows a pipe system D with diverting chamber or box A fitted to what is known as a nursery stove. In this case, shunt pipes U (which may be provided with valves) may be fitted between the upper and the lower horizontal pipe. The heating pipes D may be led into another apartment or into a drying cupboard and return to the stove, and means provided for removing any liquid due to condensation in the pipes.

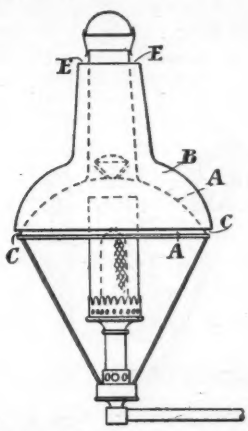
## Room-Warming Attachment for Gas-Burners.

HARVEY, W. H., of Leadenhall Street, E.C.

No. 518; Jan. 9, 1908.

This device has for its object the utilization of the heat of any ordinary gas-lighting burner for the warming of a room "without interfering in any essential respect with the light emitted from it."

The preferred form of heater is shown—viz., a hollow vessel formed of two inverted funnel-shaped shells A B of thin metal sheet, inserted concentrically one within the other; the shape of the two shells being respectively such as to permit of the existence of an air-space of considerable capacity between the two. This is suspended over the gas-burner, either from the ceiling or from a projecting arm or other support attached to the gas bracket or pendant. The air-chamber is not a closed chamber, but has air entrances C around the lower edges of the funnel mouths, and also an annular air exit E between the concentric central tubes at the top.




Harvey's Gas-Burner Heating Attachment.

The two shells are firmly attached to each other so as to retain their relative concentric positions, and when they are suspended vertically over the gas-burner, with the funnel mouth downward and with the central opening in alignment as a prolongation of the gas-burner chimney, the column of heated air and waste products from the gas-flame passes through this central opening and heats its walls. The radiant heat from the gas-flame also has its effect in heating the inner shell, so that a constant upward flow of air is set up in the air-chamber between the shells; and this air, being heated by contact with the hot walls of the inner shell, flows out into the room through the annular exit between the two funnel tubes at the top, as an addition to the column of heated air and waste products above mentioned.

## Liquid Meter.

GARDNER, J. A., of Glasgow.

No. 6011: March 18, 1908.

Meters for measuring by plotting upon a time-scale chart the volumes of liquids passing over weirs or through V-openings are, the patentee remarks, very well known; but in these it is necessary to integrate the chart before the total volume can be arrived at. The present invention has for its object to provide a meter operated by the rise and fall of a float, but in which the chart and its time-factor are eliminated and a direct reading of volumes is given upon a dial, or series of dials.

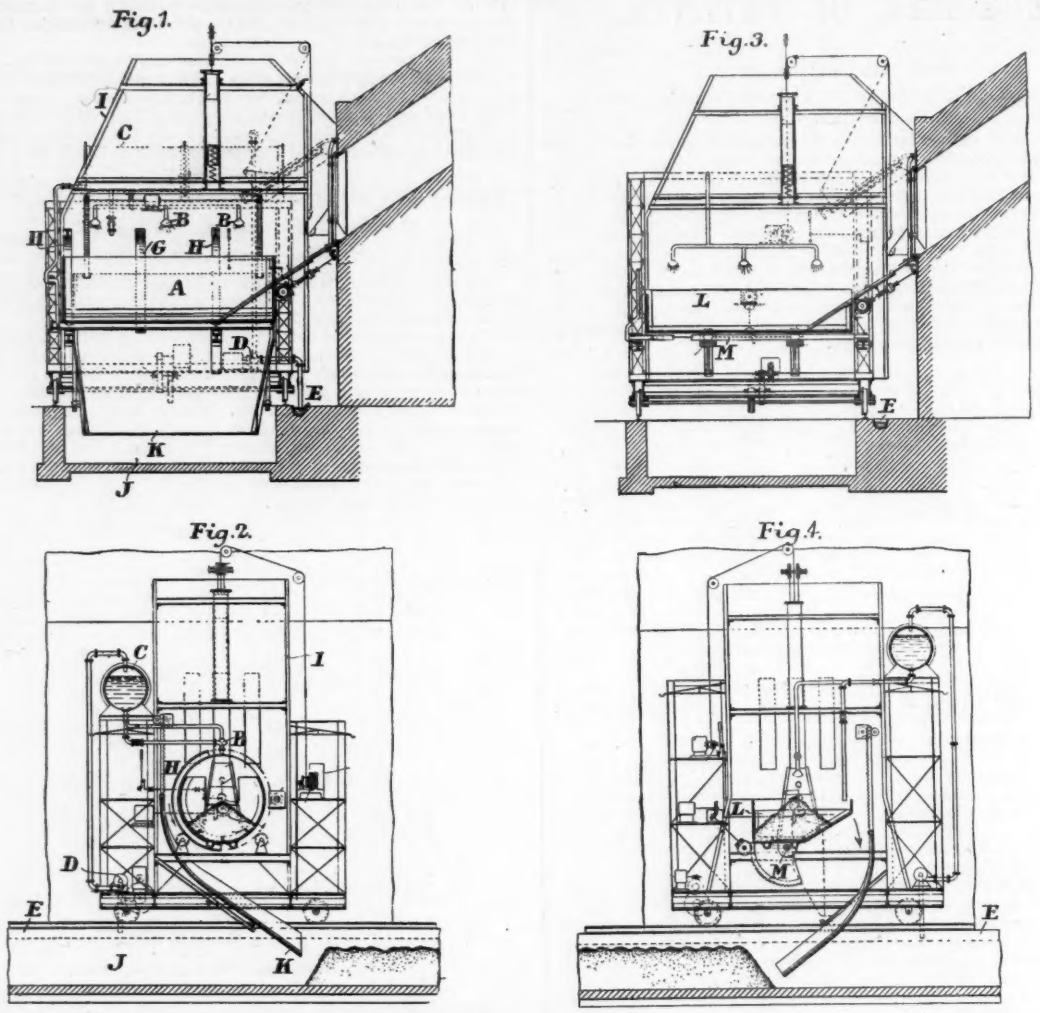
A meter made according to the invention comprises essentially a clock of constant and uniform speed, a clock the speed of which is controlled by a pendulum of variable length, means for varying the length of the pendulum in accordance with the rise and fall of a float arranged in connection with a weir or the like, a train of volume adding and recording gearing, and an epicyclic train or equivalent device between the clocks and the recording gearing, such that the gearing is operated in accordance with the position of the float—that is to say, such that the gearing is not operated at all when the float has fallen to the level at which no liquid flows over the weir, and is operated with a speed increasing proportionately with the rise of the float.

## Quenching and Discharging Coke.

RIES, H., of Munich, Germany.

No. 6251; March 20, 1908.

This invention has for its object to economize water in the quenching of coke, and to convey the coke rapidly and in a virtually automatic manner from the retort-chamber to the coke pit. The invention is particularly applicable to apparatus in which incandescent coke is discharged from the coke-oven or retort-chamber into a shallow body of water so that a portion of the coke is above the water; water being




Ries' Coke-Quenching Appliances.

sprayed on to the upper portion of the coke from above, and the mass of coke then turned over, so that its hot interior is exposed to the quenching action of the water.

Apparatus according to this invention comprises a traveller wherein a quenching trough is mounted, into which the incandescent coke is discharged direct from the oven; the trough being provided with internal projections, which assist in turning over its contents to expose them to the water. The trough has a small quantity of water in it before it receives the coke, and sprayers, carried by the traveller and supplied from a tank or a stationary conduit, discharge water on to the upper surface of the coke. The trough is then rotated in such a manner that the hot interior or kernel of the incandescent coke is exposed to the action of water from above and below; the coke being eventually discharged from a suitable form of shoot, which is preferably adjustable, into the coke pit.

The quenching trough A (figs. 1 and 2) is arranged in front of the retorts with the longitudinal axes of the trough and retort extending in the same direction. For the better quenching of the coke as hereafter described, the trough is mounted to swing about a horizontal axis. The trough is carried by a traveller running upon a track in front of the coke-oven. On the traveller are also mounted above the trough spray heads B, connected by pipes to a tank C, from which they are fed. A pipe from the tank, ending above the trough A, may be arranged in order to fill the trough more quickly. Preferably the tank is filled by means of a pump D driven by a motor, both located in the traveller, and the suction-pipe dips into a supply gutter E extending parallel to the track.

The trough A has the form of a drum capable of turning about its longitudinal axis and having an opening or mouth the width of which is much less than the diameter of the drum. To rotate the trough, a motor F is provided on the traveller; a pinion on the motor shaft meshing with a toothed ring G on the drum. At each side of this ring are provided hoops or sections H, engaged by supporting rollers, on which the drum rests.

The lower part of the interior of the drum is provided with longitudinal ribs, which serve to turn the coke when the drum is operated. Between these ribs the bottom of the drum has openings through which water may be introduced from pipes connected with the tank C. The traveller is further provided with a flue I above the quenching trough, to carry away steam evolved, without discomfort to the operators.

The door-actuating mechanism is preferably located beneath a shoot for guiding the coke to the quenching trough. This shoot, preferably made of sheet iron, consists of three sections; being secured to the frame of the door, to the traveller, and to the movable quenching trough respectively. The upper section of the shoot preferably overlaps the central portion; so that a continuous path may be provided for the coke.

Beneath the path of the traveller is arranged the coke pit J, into which is dumped the quenched coke discharged from the trough. To reduce as much as possible the power required for transferring the coke from the quenching trough to the pit, a shoot K is provided between them; and this shoot may be dropped into the operative position shown in figs. 2 and 4, or raised so as to clear the coke contained in the pit. For instance, the shoot may be pivoted to rack bars movable vertically by means of pinions rotated by a motor. A stationary inclined guide may be provided in connection with the shoot and engaged by rolls on the shoot. In fig. 2, the rolls are at the underside of the shoot; while in fig. 4 they are at the upper portion, so that the latter is suspended from the rolls. By lowering the shoot, the distance which the coke falls through the air is reduced; and thus splashing and irregular heaping is prevented. The raising of the shoot permits the traveller to be shifted without being impeded by the coke previously dumped.

The construction shown in figs. 3 and 4 differs from that illustrated in figs. 1 and 2 chiefly by the construction of the quenching trough. In each case, however, the trough can be turned about a horizontal axis. The trough L of figs. 3 and 4, can be tilted about the horizontal axis M; and the bearing lugs of the trough have rigidly connected to them toothed segments meshing with pinions driven by a motor on the traveller. The trough has an inclined wall to enable the coke to better slide off in the dumping position (dotted lines in fig. 4), and may have openings in its base through which water is supplied from below by pipes. Water is also supplied from above through spray heads and a pipe connected to the tank to a point above the inclined wall, so as thoroughly to spray and quench the central core of the coke, which is exposed by tilting the trough. The bottom of the trough may, in this case, also be provided on its inner side with ribs, which serve to turn the coke when the trough is tilted.

In operation, the coke discharged into the trough is quenched partly by water previously contained in the trough (which is partially filled with water before the coke is conveyed to it) and partly by water supplied or sprayed from above. This, however, cools chiefly the outer portions of the coke, while in the interior there remains a glowing core. To quench this core, the trough is turned about a horizontal axis, so that the coke will be turned over, and the glowing core exposed to the action of the water. The entire body of coke "can thus be thoroughly and uniformly quenched in a short time, and with the use of a comparatively small quantity of water." If the amount of water contained in the trough before the coke is discharged into it is properly proportioned, the incandescent coke will, the patentee remarks, at once

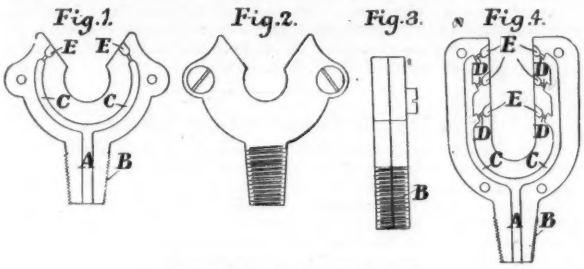
convert this water into steam, which, rising through glowing layers of coke above it, will become highly superheated, and thus withdraw considerable heat from the coke layers which are above the surface of the water. The lower layers of the coke are therefore quenched by the water contained in the trough, the upper layers by the spray from above, and the intermediate layers, after the coke has been turned, partly by sprinkling from above or by being soaked from below, partly even before that by the rising steam. The quenching having been completed, the coke is discharged from the trough into the pit by further turning or tilting the trough.

## Burners.

LEMARINIER, G., of Andeville (Oise), France.

No. 9486; May 1, 1908.

This invention relates to a burner for lighting purposes built up of two similar parts in such a manner that the parts may be easily taken apart, so as to allow of the necessary cleaning being proceeded with at once and without necessitating the use of tools.




**Lemarinier's Separable Burner.**

Fig. 1 shows one of the parts of the burner, the other being identical, and the whole being adapted to be connected by screws as shown in Figs. 2 and 3.

A semicylindrical groove, which first of all forms a straight part A in succession to the connecting pipe screwed on the threaded part B, is formed in a plate cut out according to requirements. The groove is then divided into two symmetrical arms C. At a short distance from the aperture each arm is reduced to a fine passage D, which expands into a dish or cup E. The screws which connect the parts of the burner are accessible and form a tight closing, as the surfaces in contact are perfectly planed.

The invention renders practical the construction of burners giving two, three, four, or more distinct flames. Thus fig. 4 shows a type of compound burner arranged for giving three distinct flames. In this burner there is again a straight pipe A separating into two arms C, in order each to feed three capillary passages D discharging respectively into small cups E.

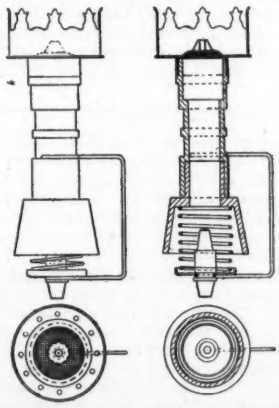
## Incandescent Burners and Anti-Vibrating Devices.

EAVES, T., of Bolton.

No. 13,693; June 29, 1908.

This invention relates to improvements in patent No. 2647 of 1903; the objects being to enable the burner, either with or without the holder for the glass chimney or the holder only, to be easily and quickly removed for cleaning the gauze top of the burner, and to replace the glass-holder and burner, or glass-holder only, without removing the other parts of the lamp, and "to increase the illuminating power of the gas."

The illustration shows a side view, a plan, a vertical section, and a sectional plan of the burner with glass-holder for fitting on a cone and resting on a spring base, as described in the 1203 patent, but modified.



**Eaves' Anti-Vibrating Incandescent Burner.**

It is now proposed to form the burner either with or without a glass-holder for incandescent mantles, to fit on to a cone-shaped base supported on a coil spring that is placed on a dished plate fitted on the base of the gas-jet. The extent of the lateral vibration of the lamp may be limited by a rod formed with a spring clip to enable it to be sprung on to the burner, allowing the burner to have vertical movement. The glass-holder is formed with a sleeve so as to fit on, or to be removed from, the burner. By these means either the burner or the glass-holder, or both the burner and the glass-holder, may be removed for the purpose of cleaning, and replaced without disturbing the other parts of the lamp.

### APPLICATIONS FOR LETTERS PATENT.

1190.—HARRIS, A. D., "Incandescent burners." Jan. 18.
1210.—LAMPLOUGH, F., "Blower or exhauster." Jan. 18.
1223.—MYERS, H. C., and ATKINSON, T. N., "Incandescent burners." Jan. 18.
1239.—WILTON, G., "Treatment of sewage, and the production of materials therefor." Jan. 18.
1261-2.—M'MULLEN, J. A., "Power-gas producers." Jan. 18.
1264.—BOUSFIELD, J. E., "Lighting and extinguishing gas-lights from a distance." A communication from the Nightingall Gas Control Company, Limited. Jan. 18.
1284.—ELY, B., "Apparatus used in the manufacture of gases." Jan. 19.
1338.—DAILLENS, H. M. DE, and JORIS, A., "Ball-and-socket joints." Jan. 19.
1371.—HARMER, E. F., "Improvements in gas lighting." Jan. 20.
1398.—BOND, C. F., "Gas-lighting appliances." Jan. 20.
1449.—KOGAN, M., and TAS, H., "Incandescent burners." Jan. 21.
1450.—ORCHARD, G. R., "Instrument for placing coins in slot gas-meters when out of reach or placed high up from the ground." Jan. 21.
1484.—DEMPSTER, R., AND SONS, LTD., BROADHEAD, J. W., and TOOGOOD, H. J., "Gas-retorts." Jan. 21.
1529.—POTTER, W. G., "Gas-burners." Jan. 21.
1531.—BOURRELLY, G., "Incandescent gas-lamps." Jan. 21.
1581.—SUTTON, C. J., and RUDD, J., "Packing mantles." Jan. 22.
1599.—GESELLSCHAFT FUR KÜNSTLICHEN ZUG. G. M. B. H., and SCHWABACH, G., "Conveying gases." Jan. 22.
1601.—ISENBURG, L., KUEHN, P., and the BRITISH MANNESMANN TUBE COMPANY, LTD., "Pipes having reinforced sockets." Jan. 22.
1607.—BIRD, H., "Charger and scoop carriage for gas-retorts." Jan. 22.
1629.—LEWES, V. B., "Incandescent mantles." Jan. 22.
1630.—MILBOURNE, R. J., "Gas-purifiers." Jan. 22.
1655.—MAY, W., "Hot-plates." Jan. 23.
1671.—GOZZARD, A., "Gas-burners of the automatic lighting and governing type." Jan. 23.

# LEGAL INTELLIGENCE.

## DAMAGE TO HIGHWAYS BY HEAVY TRAFFIC.

In the Court of Appeal last week, the Lord Chief Justice, the Master of the Rolls, and Lord Justice Buckley had before them an appeal from a judgment of Justices Channell and Sutton, in a King's Bench Divisional Court, reversing a decision of the Judge at the Redhill County Court, in an action brought by the Reigate Rural District Council against the Sutton District Water Company, the Contractor for a reservoir being joined as a third party.

The plaintiffs sued the defendants for expenses incurred in repairing certain highways within their district by reason of damage caused by the excessive weight and extraordinary traffic passing along them in consequence of the order of the defendants. On March 31, 1905, they entered into a contract with one Ewart for the construction of a reservoir near a place called How-Green; and for this purpose it was necessary that a large quantity of ballast and other materials should be taken to the site. It was brought by rail to Chipstead Station, 1½ miles away from the work, and was conveyed to it principally in trucks drawn by traction-engines. Considerable damage was thereby done to the roads; and on May 26, 1906, the Surveyor to the District Council gave a certificate showing that extraordinary expenses to the extent of £238 4s. had been incurred for repairs. Correspondence ensued between the plaintiffs and defendants, which resulted in a plaint being issued in the County Court on Nov. 1, 1906, to recover the amount named. The main defence to the action was that it was out of date, inasmuch as the proceedings were not commenced within twelve months of the time at which the damage was done, or within six months after the completion of the contract or work, in accordance with the provisions of the Locomotives Act, 1898. It was contended that the work which actually caused the damage to the roads was completed on Feb. 6, 1906, and that this was the date from which the six months' limit was to be calculated. If this contention was correct, it followed that the defendants, if liable at all, would only be liable for any damage done to the roads after Nov. 1, 1905; and it was admitted that by far the greater part of the damage was done before this date. The learned County Court Judge took the view that the six months limited by the Act was six months from the time of the substantial completion of the contract or work the carrying out of which had caused the damage—*i.e.*, the completion of the actual work which had to be done (in the present case the finishing of the reservoir)—and not from any particular incident of the work. He therefore found that the actual work that had to be done was not completed until the middle of May, 1906, and consequently that the action was brought in time. He assessed the expenses caused by the extraordinary traffic at £163 13s., and gave judgment for the plaintiffs for this amount, with costs. It appeared that it was a term of the contract between the defendants and the Contractor that the contract comprised the construction and maintenance for six months after completion of a water-tight covered reservoir of the design and to the dimensions shown upon the drawings. It also appeared that, according to a letter of the defendants' Engineer, the reservoir was ready for filling on Feb. 22, 1906, and was filled shortly afterwards. But, on cracks appearing, it was emptied and the cracks

were repaired. The reservoir was rendered water-tight by the middle of May, 1906. The Divisional Court, on appeal by the defendants, took the view that what had to be looked at was whether the work was completed in the ordinary sense, and that the reservoir was so completed when the water was let in—viz., in February. They were of opinion that the County Court Judge misdirected himself as to the meaning of the word "completion," and consequently they were not bound by his finding that this did not take place until the middle of May. They accordingly directed that judgment should be entered for the plaintiffs for the amount only which represented such portion of the damage as was done within the year. The plaintiffs appealed.

Mr. Horace Avory, K.C., and Mr. F. O. Robinson appeared for the plaintiffs; Mr. Danckwerts, K.C., and Mr. W. W. Mackenzie represented the defendants.

At the close of the arguments, which occupied the Court for portions of two days, the Lord Chief Justice said he could not see any evidence of the County Court Judge having misdirected himself. It was quite open to him to find that the work of construction was not complete until the reservoir was made water-tight; and, in his (his Lordship's) opinion, this was not done till the middle of May, 1906. The appeal must be allowed. The other learned Judges concurred.

## A GAS-PLANT CONTRACT FOR JOHANNESBURG.

An action is in dependence before Lord Mackenzie, in the Court of Session at Edinburgh, which relates to the provision of gas-generating plant, gas-engines, and electricity generating plant for Johannesburg, to be used for lighting and tramway power purposes. The pursuers are the Municipal Council of Johannesburg; and the defenders, Messrs. D. Stewart and Co. (1902), Limited, of Glasgow, and Mr. W. Beardmore, and Mrs. Beardmore, widow of Joseph Beardmore, called as his executrix.

The purpose of the action referred to is to obtain declarator that the Council were entitled to reject, and did reject, the whole of the plant supplied by the defenders, and to recover from the Company three sums of £143,095, £206,424, and £69,175—together amounting to £418,694—and to recover from Mr. and Mrs. Beardmore, jointly and severally, or severally, the sum of £115,134. In March, 1904, the Council, having received tenders, accepted those of Messrs. Poetter and Co., of Dortmund, Germany, for the gas-generating plant, and of Messrs. D. Stewart and Co. for the remainder of the plant. It was, however, arranged that Messrs. Stewart were to take over the contract of Messrs. Poetter; the Council agreeing to that being done in order to have only one Contractor, and agreeing to pay £2500 more for the convenience—the contract price being then £212,768. The tenders invited were alternatively for gas and steam generating plant; and it is stated that the Municipality ascertained from the tenders that although the capital outlay on gas plant would exceed by about £28,000 that on steam plant, the annual saving to the Council in the working cost of the gas plant as compared with steam plant would be about £15,000, and that they resolved to adopt the gas plant. There was, it is stated, much delay in the execution of the work, and two contracts were subsequently entered into, with a view to enabling the contract to be completed. It was not completed when, on May 15, 1907, the Contractors retired from the work; and on July 5, 1907, the Council intimated their rejection of the whole plant, and claimed repayment of £143,095, which had been paid to the Contractors. The second and third sums sued for are the *cumulo* amount of damages said to have been incurred through delay in the work. The £115,134 sued for is the amount of a bond granted as security for the faithful performance of the obligations undertaken by the Contractors. It is asserted that, in consequence of the closing of the works by the Contractors, there was an entire stoppage of the tramway service, and the town was left in darkness at night until other arrangements could be made. The Council have since erected steam instead of gas generating plant. The defects in the plant are said to be that the gas produced contained a great excess of tar and other impurities, which clogged the engines and increased their inefficiency; that the gas-cookers were defective and incapable of fulfilling their functions; that the tar-extractors could not be run at a proper speed, owing to excessive vibration, caused by faults of design and workmanship; that the cooling and cleaning apparatus were defective; that the gas-producing capacity was materially less than that stipulated for; that the gas required by the engines greatly exceeded the limit contracted for; that the engines were incomplete and inefficient—the most efficient being 20 to 25 per cent. below the efficiency stipulated, and two of them could be run only to their detriment owing to the parts knocking badly, in consequence of slackness of joints; that the lubricating arrangements were defective, causing great wear and tear and damaging the bearings, and allowing oil to escape, and to weaken the foundations; that some of the cylinders were cracked; that there was frequent breaking of piston rings, causing great leakage of gas into the engine-room, and there was also leakage of gas at the pump joints, which were damaged by the pistons striking the ends; and that in consequence of the leakage of gas the health of the workmen was affected, many being rendered insensible, and one had died.

The defenders say that they supplied plant in accordance with the terms of the contracts, and according to the instructions of the Council's Engineers; that any defects in the working of the producer plant were due to inferior coal supplied by the Council, to the faulty system of fans and blowers insisted upon by the Council's Engineers, contrary to their advice and protest, and to the Council's failure to supply power for the blowers. They were willing to remedy the defects, but were not allowed to. In any event, they maintain, the Council were not entitled to reject the entire plant, and in doing so they acted in breach of the contract. It is maintained that Mrs. Beardmore is not the executrix of her husband, no appointment having yet been made, and that she is not subject to the jurisdiction of the Court. On behalf of all the defenders, it is maintained that, by the contract, any difference should be referred to an arbiter appointed under the law of England; that they hold an indemnity from Messrs. Poetter with reference to the gas generating plant, which provides that the High Court of Justice in England shall have jurisdiction in all matters under the agreement; that under the law of England, any decree against the defenders could be enforced against Messrs. Poetter and Co., whereas no decree in the Scottish Courts would be binding on Messrs. Poetter and Co.; and the plea of *forum non conveniens* is therefore put forth. It is also maintained that the failure of the Council to submit the dispute to arbitration is a breach of the contract for which the bond of surety was granted, and that therefore the grantees of the bond are released from any liability under it.

The case was sent to the roll for discussion upon the questions of law contained in it; and on Saturday last Lord Mackenzie gave his judgment upon these points.

In the first place, he found that jurisdiction could not be established against Mrs. Beardmore without proof, and that, as the pursuers did not ask for proof, she was entitled to have the action as against her dismissed, which he did. Then he was of opinion that the termination of the contract by the defenders did not determine the rights and obligations of the parties under the whole contract. The claim, in his opinion, was one of damages, and must be referred to arbitration, which, under the contract, must be in accordance with the law of England upon arbitrations. This did not exclude the jurisdiction of the Scotch Court, which could give effect to an arbitration under English law. He therefore sent the case to arbitration, and sisted it so far as directed against Mr. W. Beardmore.

## Defrauding the Commercial Gas Company.

At the Thames Police Court last Tuesday, before Mr. Chester Jones, Jacob Woolf, of Commercial Road, was summoned for causing to be laid a pipe communicating with one belonging to the Commercial Gas Company without their consent. The defendant pleaded "Guilty." Mr. Young stated that Woolf was a restaurant keeper. There was a meter in the cellar of his house, but the gas had been cut off. Upstairs there was a prepayment meter, and the defendant had connected a pipe with it. He formerly lived at New Road, and when he left he owed the Company more than £4 for gas. He then moved to a house in Commercial Road, and, knowing he would not be supplied with gas, he asked a neighbour to sign the agreement. The two afterwards quarrelled, and then the neighbour gave notice to have the gas disconnected. Woolf thereupon employed a man to fix the pipe in question. Altogether the defendant owed the Company more than £7 for gas consumed. He had been convicted several times of various offences. His Worship fined him 40s. and 23s. costs, with the alternative of 21 days' imprisonment with hard labour.

## Responsibility for Outside Stopcock Boxes.

At the Lambeth County Court last Wednesday, a case was heard by Judge Emden, the main feature of which was the onus of responsibility in regard to outside stopcock boxes. It was an action brought by a Mrs. Hill against the Southwark Borough Council, for £40 damages in respect to injuries sustained by her in August last, in Hillington Street, Walworth, owing to the heel of one of her boots becoming fixed in a stopcock box while walking, causing her to fall heavily. Some twenty years ago, there was fixed in the street named, for the then existing Vestry of St. Mary, Newington, a meter, the supply to which was governed by an outside stopcock, having attached to it a guard-box placed on the main side of the meter. The work of fixing the meter, together with the service-pipe from the main, including the stopcock and guard-box, was carried out by the Southwark and Vauxhall Water Company on the requisition of the Vestry, and was paid for by them. The point raised was whether the defendants, as successors to the Vestry, or the Metropolitan Water Board, who acquired the undertaking of the Company, were liable for accidents arising from the existence of such an appliance as an outside guard-box. Mr. D. F. Worger, the Engineer of the southern district of the Board, who was called as a witness for the plaintiff, stated that the meter in question was originally fixed for the Vestry by the Water Company, the former paying all charges for the provision of the necessary fittings, including the guard-box. This being the case, he was of opinion that the ownership and responsibility in regard to these fittings rested with the defendants. After a long legal argument, his Honour decided that, as the work carried out was taken over and paid for, the defendants were responsible; and he gave judgment for the plaintiff for £22 10s. and costs.

**Public Lighting of Newport (Mon.).**—It was lately reported to the Newport Lighting Committee that the Gas Company had offered to change the flat-burner system of 485 lamps, now used in lighting the town, to an incandescent installation. The Borough Engineer was instructed to prepare a report on the lamps, excluding the streets through which the electric mains run, and also upon the question of lighting the whole town by electricity.

**Inefficient Electric Lighting at Chelmsford.**—The Chelmsford Town Council have adopted a report in which the Lighting Committee stated that Mr. J. Eustace, the Resident Engineer of the Electric Supply Corporation, had attended in reference to the complaint that the arc lamps, with a few exceptions, had not for some time been lighted in an efficient manner in accordance with the provisions of the contract. He stated that the Company were gradually having the whole of the arc lamps overhauled, and were taking all possible steps to make them efficient. The Committee were of opinion that the lamps were not, during the quarter ended Sept. 29, lighted in conformity with the contract. They unanimously recommended the Council to deduct from the amount of the account for that quarter £10 10s., by way of compromise, and without reference to any question of the actual loss of light, and to give the Company notice that, as from Jan. 1, 1909, the Council would hold them responsible for the strict performance of the contract. The Committee were also of opinion that the lamps had not been lighted efficiently during the December quarter, and recommended another deduction of £10 10s.

# MISCELLANEOUS NEWS.

## GASLIGHT AND COKE COMPANY'S ACCOUNTS.

In the "JOURNAL" last week (p. 226), we gave the report of the Directors of the Gaslight and Coke Company for the six months ending the 31st of December, which will be presented at the ordinary general meeting next Friday. It was accompanied by the accounts in the usual form, from which we take the following particulars.

The statement of capital (stock) sets forth that the total paid up is £9,466,500; added on conversion, £12,176,565—total amount authorized, £21,643,065. Deducting the amount redeemed, £81,655, the total amount of the Company's existing capital powers is £21,561,410. The statement of loan capital stands thus: Total paid up, £2,844,000; added on conversion, £1,479,975; unissued, £750,000—total amount authorized, £5,073,975.

The capital account shows receipts (with premiums, £1,586,807 11s. 9d.) to the amount of £27,472,192 11s. 9d. The expenditure is shown in the following items:—

| | | |
|---|---|---|
| Expenditure to June 30, 1908 | | £13,471,869 7 4 |
| Expenditure during the half year to Dec. 31, 1908—viz., | | |
| Buildings and machinery in extension of works | £12,433 9 1 | |
| New and additional mains and service-pipes | 19,615 8 9 | |
| Do. do. meters | 23,966 10 1 | |
| Do. do. stoves | 26,987 18 5 | |
| | | 83,003 6 4 |
| | | £13,554,872 13 8 |
| By sale of surplus land | £566 3 9 | |
| By depreciation of plant | 8,246 5 8 | |
| By depreciation of meters and stoves | 37,568 18 5 | |
| | | 46,381 7 10 |
| Total expenditure | | £13,508,491 5 10 |
| Nominal amount added on conversion | | 13,656,540 0 0 |
| | | £27,165,031 5 10 |
| Deduct amount of capital redeemed under Company's Act of 1903 | | 81,655 0 0 |
| | | £27,083,376 5 10 |
| Balance of capital account | | 388,816 5 11 |
| | | £27,472,192 11 9 |

The balance applicable to the redemption fund and to dividend on the ordinary stock is £776,985 11s. 8d.; and the following statement shows how it is proposed to appropriate it:—

| Dec., 1907. | | | |
|---|---|---|---|
| £306,992 | .. | Net balance brought from last account | £412,298 6 1 |
| 386,576 | .. | Net revenue for the half year | 364,687 5 7 |
| £693,568 | | | £776,985 11 8 |
| 10,000 | .. | Contribution to redemption fund | 10,000 0 0 |
| (£4 8s. per cent.) | | Dividend on the ordinary stock— | |
| £334,017 | .. | £4 10s. 8d. per cent. per annum on £15,161,545 | 343,661 13 9 |
| £349,551 | .. | Balance carried to next account | £423,323 17 11 |

The following is the revenue account:—

*Expenditure.*

| Dec. Half Year, 1907. | | £ s. d. | £ s. d. |
|---|---|---|---|
| | Manufacture of gas— | | |
| £592,056 | Coal into store | 561,954 12 11 | |
| 80,753 | Oil ,, less value of oil tar | 83,879 16 9 | |
| 37,147 | Coke and breeze used in the manufacture of carburetted water gas | 33,758 7 11 | |
| 15,675 | Salaries of Engineers and other officers at works | 14,890 17 9 | |
| 97,703 | Wages | 90,947 17 4 | |
| 19,028 | Purification | 12,685 0 6 | |
| 188,099 | Repair and maintenance of works and plant, materials and labour, less received for old materials, £4488 18s. 2d. | 175,049 9 1 | |
| | | | 973,166 2 3 |
| | Distribution of gas— | | |
| 44,161 | Salaries and wages of officers (including rental clerks) | 45,307 8 9 | |
| 49,645 | Repair and maintenance of mains and service-pipes, &c. | 54,993 16 5 | |
| 48,263 | Repair and renewal of meters | 52,014 14 5 | |
| 50,788 | ,, ,, stoves | 55,486 7 2 | |
| 31,910 | Gas fittings, including labour (automatic meter supplies) | 34,139 5 9 | |
| | | | 241,941 12 6 |
| 19,716 | Public lamps—lighting and repairing | .. | 19,953 5 11 |
| | Rents, rates, and taxes— | | |
| 5,885 | Rents payable | 5,894 17 7 | |
| 138,914 | Rates and taxes | 142,386 11 0 | |
| | | | 148,281 8 7 |
| | Management— | | |
| 2,750 | Directors' allowance | 2,750 0 0 | |
| 202 | Company's Auditors and Assistant | 202 2 0 | |
| 8,963 | Salaries of General Manager, Secretary, Accountant, and clerks | 8,184 2 9 | |
| 23,686 | Collectors and cashiers | 22,831 1 11 | |
| 6,328 | Stationery and printing | 5,766 0 10 | |
| 6,110 | General charges | 5,740 1 0 | |
| | | | 45,473 8 6 |
| .. | Parliamentary charges | .. | 828 1 6 |
| 1,192 | Law charges | .. | 1,468 0 0 |
| 6 378 | Bad debts | .. | 7,558 16 4 |
| 500 | Depreciation fund for works on leasehold lands | .. | 500 0 0 |
| 25,254 | Annuities to officers and workmen, including contribution to officers' superannuation fund | .. | 25,284 2 2 |
| 1,695 | Workmen's compensation account | .. | 1,694 16 5 |
| | Public officers— | | |
| 911 | Gas Referees and Official Auditor | 766 3 9 | |
| 600 | Public testing-stations | 603 10 7 | |
| | | | 1,369 14 4 |
| £1,504,312 | | | 1,467,519 8 6 |
| 589,414 | Balance carried to net revenue account | | 559,534 14 2 |
| £2,093,726 | | | 2,027,054 2 8 |

*Receipts.*

| Dec. Half Year, 1907. | | £ s. d. | £ s. d. |
|---|---|---|---|
| | Sale of gas— | | |
| £1,462,142 | Per meter, at 2s. 10d. and 2s. 5d. per 1000 cubic feet | 1,418,615 12 7 | |
| 75,2 6 | Public lighting and under contracts | 74,638 3 0 | |
| | | | 1,493,253 15 7 |
| £1,537,358 | | | |
| 14,561 | Rental of meters (ordinary) | .. | 28,742 13 6 |
| 40,226 | Rental of stoves | .. | 42,362 5 4 |
| 59,224 | Rental of fittings | .. | 63,901 3 8 |
| | Residual products— | | |
| £295,464 | Coke, less £34,508 12s. 3d. for labour, &c. | 258,863 12 2 | |
| 17,055 | Breeze, less £5688 11s. 7d. for ditto | 15,336 18 0 | |
| 44,718 | Tar and tar products | 43,865 9 9 | |
| 80,229 | Ammoniacal liquor and sulphate of ammonia | 75,843 11 6 | |
| | | | 393,909 11 5 |
| £437,466 | | | |
| £4,618 | Rents receivable | | 4,591 3 2 |
| 273 | Transfer fees | | 293 10 0 |
| £2,093,726 | | | 2,027,054 2 8 |

The three statements relating to the reserve, insurance, and depreciation funds, stood as follows on the 31st of December: Reserve fund, £65,982; insurance fund, £116,363; depreciation fund, £69,226. The insurance fund was drawn upon to the amount of £2658 to satisfy claims arising out of the explosion in May's Yard, Holborn, on July 30, 1906.

The following statements relate to the working:—

*Statement of Coal Used, &c.*

| Description of Coal. | In Store June 30, 1908. | Received During Half Year. | Carbonized During Half Year. | Used During Half Year. | In Store Dec. 31, 1908. |
|---|---|---|---|---|---|
| | Tons. | Tons. | Tons. | Tons. | Tons. |
| Common | 150,886 | 887,615 | 812,905 | 1,816 | 223,780 |
| Cannel | 5,399 | .. | 302 | .. | 5,097 |
| Total | 156,285 | 887,615 | *813,207 | 1,816 | 228,877 |

* In addition to this quantity of coal, 7,308,936 gallons of oil and 36,215 gallons of spirit were used during the half year.

*Statement of Residual Products.*

| Description. | In Store June 30, 1908. | Made During Half Year. | Used During Half Year. | Sold During Half Year. | In Store Dec. 31, 1908. |
|---|---|---|---|---|---|
| Coke—tons | 44,088 | 504,624 | 103,124 | 424,310 | 21,278 |
| Breeze—tons | 10,070 | 70,096 | 11,891 | 66,308 | 1,967 |
| Tar, from coal only—galls. | 615,012 | 8,384,378 | 8,132,141 | 57,146 | 810,103 |
| Ammoniacal liquor—butts | 15,775 | 250,556 | 244,624 | .. | 21,707 |

*Statement of Gas Made, Sold, &c.*

| Quantity Made. | Quantity Sold. | | Total Quantity Accounted for. | Number of Public Lamps. |
|---|---|---|---|---|
| | Public Lights and Under Contracts. (Estimated.) | Private Lights (per Meter). | | |
| Thousands. | Thousands. | Thousands. | Thousands. | |
| *11,473,469 | 462,224 | 10,315,009 | 10,905,873 | 48,959 |
| †11,489,900 | 470,808 | 10,328,305 | 10,931,208 | 49,135 |

* Including 2,563,544,000 cubic feet of carburetted water gas. † Dec. half year, 1907.

The remaining statement is the balance-sheet, which gives the value of the stores in hand at the close of the half year as follows: Coal, £158,609; oil and petroleum spirit, £40,882; coke, £11,717; tar and ammoniacal liquor and products, £107,441; and sundries, £213,665. The figures this time last year were: Coal, £173,635; oil and petroleum spirit, £42,971; coke, £7330; tar and ammoniacal liquor and products, £87,032; and sundries, £208,845.

## SOUTH METROPOLITAN GAS COMPANY'S ACCOUNTS.

[For the Half-Yearly Report, see p. 310.]

The following are the principal portions of the accounts of this Company for the six months ending the 31st of December.

The first two statements relate, as usual, to the stock and loan capital. The former sets forth that the standard rate of 4 per cent. is payable on £6,011,224 and £418,671 (Act of 1901) of stock; while the latter shows that the loan capital, the rate of interest on which is 3 per cent., amounts to £1,798,994 and £96,451 (Act of 1901). The third statement is the capital account. It stands as follows: Amount received, £5,328,820; nominal amount added by conversion (less premium), £2,996,520—total, £8,325,340. The items of expenditure are as follows:—

| | | |
|---|---|---|
| Capital account to June 30, 1908 | | £5,036,523 16 4 |
| Expenditure during half year to Dec. 31, 1908, viz.— | | |
| New and additional mains and services | £1,653 15 6 | |
| New and additional meters | 1,784 3 7 | |
| New and additional stoves | 1,451 3 11 | |
| | | 4,889 3 0 |
| Total expenditure | | £5,041,412 19 4 |
| Balance | | 287,407 0 8 |
| | | £5,328,820 0 0 |
| Nominal amount added by conversion, less premium | | 2,996,520 0 0 |
| Total | | £8,325,340 0 0 |

The following is the revenue account:—

*Expenditure.*

| | | | |
|---|---|---|---|
| Manufacture of gas— | | | |
| Coal into store | £383,118 19 5 | | |
| Purification | 7,965 16 4 | | |
| Salaries of Engineer and Officers at works | 13,509 13 8 | | |
| Wages (carbonizing) | 55,351 2 7 | | |
| Repairs and maintenance of works and plant, less £2293 3s. 6d. received for old materials | 91,178 10 5 | | |
| | | £551,124 2 5 | |
| Co-partnership | | 13,000 0 0 | |
| Distribution of gas— | | | |
| Repair, maintenance, and renewal of mains and service-pipes | £25,939 19 8 | | |
| Salaries and wages of officers, including rental clerks | 18,091 9 6 | | |
| Repairing and renewals of meters | 32,392 2 1 | | |
| Repairing and renewals of stoves | 32,398 11 4 | | |
| Repairing and renewals of gas-fittings | 26,163 8 10 | | |
| | | 134,985 11 5 | |
| Public lamps, including £15,233 12s. 9d. for labour and materials, less £14,468 5s. 4d. received for the same | | 765 7 5 | |
| Rents, rates, and taxes— | | | |
| Rents payable | £1,047 7 9 | | |
| Rates and taxes | 43,723 9 5 | | |
| | | 44,770 17 2 | |
| Management— | | | |
| Directors' allowance | £2,502 4 9 | | |
| Salaries of Secretary, Accountant, and clerks | 3,269 4 10 | | |
| Collectors { Ordinary | 6,457 3 11 | | |
| Collectors { Slot meter | 8,852 12 5 | | |
| Stationery and printing | 2,930 10 4 | | |
| General charges | 9,343 16 11 | | |
| Company's Auditors | 112 10 0 | | |
| | | 33,468 3 2 | |
| Law charges | £1,354 17 9 | | |
| Parliamentary charges | 532 10 3 | | |
| | | 1,887 8 0 | |
| Bad debts | | 2,471 9 0 | |
| Stolen from 5061 slot meters broken open | | 465 12 7 | |
| Pensions and officers' and workmen's superannuation, sick, and accident funds | | 6,951 9 2 | |
| Gas Referees and Official Auditor | | 251 9 2 | |
| Total expenditure | | £790,141 9 6 | |
| Balance carried to net revenue account | | 205,643 8 7 | |
| | | £995,784 18 1 | |

*Receipts.*

| | | | |
|---|---|---|---|
| Sale of gas— | | | |
| Michaelmas, at 2s. 3d. per 1000 feet | £265,971 1 1 | | |
| Christmas, at 2s. 3d. per 1000 feet | 383,369 3 6 | | |
| | £649,340 4 7 | | |
| Public lighting | 17,107 9 10 | | |
| | | £666,447 14 5 | |
| Meters in use (338,353)— | | | |
| Company's meters at rent: Ordinary, 98,645; slot, 231,423 | £37,359 16 5 | | |
| Company's stoves at rent: Ordinary, 77,181; slot, 187,980; fires, 23,830 | 29,650 0 9 | | |
| | | 67,009 17 2 | |
| Residual products— | | | |
| Coke, less labour and cartage | £167,7 1 18 9 | | |
| Breeze, less labour and cartage | 5,671 7 3 | | |
| Tar and tar products, less labour | 32,168 15 8 | | |
| Sulphate of ammonia | 54,886 5 9 | | |
| | | 260,478 7 5 | |
| Rents receivable | | 1,761 11 7 | |
| Transfer fees | | 87 7 6 | |
| Total receipts | | £995,784 18 1 | |

Total amount paid in wages for half year, £262,054 16s.
" " " salaries " £35,005 16s.

The net revenue account shows a sum of £178,835 7s. 4d. applicable to dividend on the ordinary stock. Following this are the statements relating to the reserve, renewal, and insurance funds. They show that the balances on Dec. 31 were as follows: Reserve fund, £189,164; renewal fund, £28,162; insurance fund, £110,350.

The statements furnishing manufacturing details are as follows:—

*Statement of Coal.*

| In Store June 30, 1908. | Received During Half Year. | Carbonized During Half Year. | Used During Half Year. | In Store December 31, 1908. |
|---|---|---|---|---|
| Tons. 86,806 | Tons. 609,564 | Tons. 580,775 | Tons. 830 | Tons. 114,765 |

*Statement of Residual Products.*

| Description. | In Store June 30, 1908. | Made During Half Year. | Used During Half Year. | Sold During Half Year. | In Store Dec. 31, 1908. |
|---|---|---|---|---|---|
| Coke—cwts. | 500,060 | 7,196,340 | 1,782,751 | 5,021,709 | 891,940 |
| Breeze—yards | 10,229 | 132,277 | 42,585 | 87,749 | 12,172 |
| Tar—gallons | 448,487 | 5,705,774 | 5,449,201 | 47,457 | 657,603 |
| Ammoniacal liquor—butts | 8,578 | 199,473 | 195,331 | .. | 12,720 |

*Statement of Gas Made, Sold, &c.*

| Quantity Made. | Quantity Sold. | | Total Quantity Accounted for. | Number of Public Lamps. |
|---|---|---|---|---|
| | Public Lights (estimated). | Private Lights (per Meter). | | |
| Thousands. 6,367,048 | Thousands. 176,787 | Thousands. 5,829,414 | Thousands. 6,082,993 | 23,811 incandes't 11 flat flame |

The remaining statement is the balance-sheet, which gives the value of the stores in hand at the close of the half year as follows: Coal, £75,852; coke and breeze, £27,493; tar, sulphate, and ammoniacal liquor, £43,288; and sundries, £293,012. The figures this time last year were: Coal, £105,782; coke and breeze, £13,091; tar, sulphate, and ammoniacal liquor, £36,427; and sundries, £290,214. A sum of £37,185, workmen's bonuses and savings, has been deposited with the Company; and the total of the officers' superannuation and guarantee funds is £49 509. The figures last year were £35,543 and £43,927.

## SOUTH METROPOLITAN COMPANY'S RATING APPEALS.

### Application for Surcharge at Greenwich.

Last Thursday, Mr. H. D. Gordon, one of the Local Government Board Auditors, sat at the Union Offices, Greenwich, to hear an application by the South Metropolitan Gas Company that the Guardians should be surcharged certain moneys paid to their Valuers, Messrs. Dinwiddy and Sons, in respect of appeals arising out of their last quinquennial valuation of the gas undertakings of the district. Previous reports (see *ante*, pp. 120, 253) have shown that the Company have taken similar action in Woolwich and Bermondsey, where, up to the present, disallowances of £112 and £127 19s. have been made by the Auditors. The case in regard to Lewisham has yet to be heard. All the cases are similar in character.

Mr. L. N. S. Pasmore (Messrs. Hicklin, Washington, and Pasmore), instructed by Mr. F. M'Leod, the Secretary of the Company, appeared for the objectors; Mr. Conrad Dinwiddy represented his firm.

Mr. Pasmore explained that, as all the points of objection were known to the Auditor, he appeared more to preserve the status of the Company than to labour once more the details. What he did again ask the Auditor to rule, however, was that if Messrs. Dinwiddy had only received, as remuneration for the work connected with appeals, the amounts down to which their bills of costs were taxed, they would have been amply rewarded. There was one difference between the Greenwich case and the cases of the other municipal areas. In Greenwich, the Guardians appeared, and most properly, to have looked after the interests of the ratepayers, and they themselves contested Messrs. Dinwiddy's charges; the result being that the firm took in settlement exactly half of the amount first asked for. Their bill of costs against the Company alone was £1035 10s. There was another bill, for further work, amounting to £236 6s. 7d.—making £1271 16s. 7d. in all; and when the Guardians protested, Messrs. Dinwiddy agreed to take £635 18s. 3½d. in full discharge of the combined bills. He supposed the Auditor would not adopt his (the speaker's) suggestion, and allow only the party taxation costs. He could therefore only ask for a substantial reduction off even the sum paid.

The Auditor said he should first see that Messrs. Dinwiddy's appointment was properly made; then he would examine the details of remuneration, and see whether or not the amounts were reasonable; and after that he would consider whether the Guardians had acted to the best of their discretion. If he wanted more information, he would write for it; and when he had arrived at his conclusions he would put in his reasons for them.

Mr. Pasmore pointed out that in Greenwich there was no contract with Messrs. Dinwiddy.

Mr. Conrad Dinwiddy contended that the certificate of a Taxing Master was no criterion that the correct amount had been certified for in regard to surveyors' work. There were Rules of Court and scales of fees governing such work, which justified the bills of costs delivered by his firm. With regard to the reduction made in Greenwich, if he had had the running of the matter at the time, he would not have given so much. There was a good deal of work not specified in the bills of costs delivered.

Mr. Saw, the Clerk to the Guardians, said that when Mr. Dinwiddy, sen., attended at the Board with regard to his bill, the Guardians found him in a yielding mood, and struck a bargain which was not to their disadvantage.

The Auditor intimated that further meetings would be arranged in the near future, in Greenwich and Woolwich, to deal with this matter.

**Half-a-Century's Progress in Gas Supply at Burnley.**—The Year Book of the Burnley Corporation just published contains some particulars showing the development of the gas undertaking since its acquisition 53 years ago by the Improvement Commissioners, who were the predecessors of the Town Council in the government of the town. The works in existence in 1855 were capable of producing 384,000 cubic feet of gas per day; while the plant now in use turns out 4,500,000 cubic feet in the same time. Fifty-three years ago, the greatest consumption of gas in 24 hours was 267,000 cubic feet; whereas in one day last year it reached 3,489,000 cubic feet. In 1855, the consumers numbered 1608; now there are 12,051 using ordinary meters and 12,055 with penny-in-the-slot meters, while the gas consumers outside the borough total 1239.

**Deaths from Gas Poisoning at Plymouth and Stonehouse.**—An engineers' clerk, named Robert Scantlebury, and a woman named Ann Fenwell were found dead in bed last Sunday week at the residence of the former in Rendle Street, Plymouth. At the inquest, it was shown that death was due to gas poisoning. The gas was turned on at a fire in the bedroom; and the ventilating pipe was stopped up, preventing the escape of the gas into the chimney. The gas was also issuing from a bracket by the side of the bed, the nipple of which was loose. There was no evidence to show whether the gas was purposely turned on or who did it; and the Jury found a verdict to this effect. Another death from gas poisoning occurred on Monday morning at High Street, Stonehouse, in the same neighbourhood; a Mrs. Amelia Dawe being found dead in bed. Every crevice in the room had been carefully covered. There was a cooking-stove in the room; and the gas at this, as well as at the bracket, was on full. Apparently the woman had placed several coppers in the automatic meter, so as to ensure a sufficient supply of gas. Among the newspapers found in the room was one containing an account of the Plymouth tragedy. At the inquest a verdict of "Suicide while temporarily insane" was returned.

## THE PROPOSED GAS AMALGAMATION IN WEST HAM.

### Attitude of the West Ham Corporation.

At the Meeting of the West Ham Corporation last Tuesday, the Legal and Parliamentary Committee presented reports on the Bill of the Gaslight and Coke Company by the Gas Examiner (Mr. W. C. Young), the Borough Engineer (Mr. J. G. Morley), the Electrical Engineer (Mr. A. H. Seabrook), and the Treasurer.

In the course of his report on the Bill, Mr. Young said: "The clause in the preamble that the proposed amalgamation would be to the advantage of consumers in the joint areas affected is, in my opinion, fully justified, for reasons which I give farther on. The arrangement between the Gaslight and Coke Company and the London County Council as to the reduction of the standard price mentioned in the preamble, was come to in consequence of the Company's intention to reimpose meter-rents, and was to come in force when this was done. Clause 16 (applying the provisions of the Gaslight Company's Acts to the extended limits) is very comprehensive; but I know of no statutory powers possessed by the Gaslight Company different from those of the West Ham Company to which exception could be taken. It may, however, be as well to consult a gas engineer on this point. In any case, it must be remembered that the Gaslight Company have for many years operated within the borough of West Ham; and if that Company had special powers in any way objectionable, it must be within the knowledge and experience of Corporation officials. Clause 17 incorporates the provisions of the Gas-Works Clauses Act, 1871, as to the testing of the gas and as to penalties. There is no objection to this as regards penalties; but the provisions as to testing are quite inadmissible. By this Act the official testing-place is to be on the gas-works. While gas was made at Silvertown, the testings were made on the gas-works there. But gas making has ceased at that station; therefore the testing-place would have to be at Beckton, which is about two miles away from the centre of the existing district of the Gaslight Company within the West Ham borough. It will be within your recollection that a few years back, when before a Parliamentary Committee who were considering a Bill promoted by the Gaslight Company, the West Ham Corporation endeavoured to persuade the Company to incorporate this Act, so as to legalize our testings at Silvertown; there being considerable doubt as to whether this Act then applied to the Company. The Counsel representing the Company stated on that occasion, in the most positive manner, notwithstanding the denials of the Company's Solicitor and officers, that this Act did apply to the Company; and he produced a short Act of the Company (dated, I think, 1891), which bore out his contention. The Company gave an undertaking before the Committee that the consumers in West Ham should be treated alike with those in the Metropolis in regard to the quality and purity of the gas supplied and as to the facilities for testing, except that the testings were not to be brought under the jurisdiction of the Metropolitan Gas Referees. I may mention that as there were many objections to the Silvertown Gas-Works as an official testing-place, some correspondence with the Company's officials ensued, and I had some interviews with the Company's Chief Engineer on the subject. Ultimately it was arranged that the testing-place should be removed to the Company's office in the Tidal Basin Road. But before this was done, it was discovered that no Silvertown gas found its way there, and the scheme was abandoned. Subsequently it was agreed that the testing apparatus should be removed from the meter-house where it was fixed at the entrance to the works. This, however, was not done, and the apparatus remains where it has always been."

Passing to clause 30, which deals with the reduction in the standard price and the amendment of enactments relating to the sliding-scale, Mr. Young said: "As the decrease in the standard dividend is in much greater proportion than (roughly twice as great as) the increase in the standard price, it appears to me obvious that the interests of the private consumer are fully defended." On the Company's clause 34, which proposes a reduction in the standard illuminating power of the gas from 16 to 14 candles, he said: "This reduction was inevitable, having regard to the fact that the Company was the only one of the Metropolitan Gas Companies who maintained the 16-candle standard. If this proposal be adopted, the illuminating power of the gas supplied in London and the Metropolis and all the suburbs will be uniform, which is very desirable. I do not think the London County Council will oppose this, as their Counsel, in the course of his address to the Parliamentary Committee on the Council's Gas Bill of 1905, said that, though the Council were not proposing it, they would like to see uniformity in the gas supply of London, even to the reduction of the Gaslight Company's gas from 16 to 14 candles, in view of the fact that Parliament had permitted both the South Metropolitan and the Commercial Gas Companies to reduce their power." With regard to clause 36, having reference to the period of error in defective meters, Mr. Young said the provision was "obviously fair."

Concluding his report, Mr. Young said: "Under the provisions of this Bill, it appears to me that there can only be two testing-places—one at the Beckton works and the one in present use at Leytonstone; further, that the hours of testing will be those given in the Gas-Works Clauses Act, 1871—viz., from 5 p.m. to 10 p.m. from April to September, and from 8 p.m. to 11 p.m. from October to March. At the present time, the hours are from 5 to 11 p.m. all the year round. I suggest that the Corporation should endeavour to get the following provisions embodied in the Bill: (1) The Gas Company to provide and maintain two testing-places in addition to the one existing at Leytonstone—one at Canning Town and the other at Stratford—fitted with all necessary apparatus. (2) The gas supplied to be of the same degree of purity, quality, and heating power as required in the Metropolis from time to time, and subject to the same tests, but the Metropolitan Gas Referees not to have any control. (3) The testing to be made at any time of the day, and an average of three testings, at intervals of not less than half-an-hour, to be taken as representing the illuminating power of the gas at that testing when the result is below the standard. Taking a broad view of the Bill, and having due regard to the unrivalled facilities for the economical manufacture of gas at the Beckton works, and the greatly improved financial position of the Gaslight Company in the last two or three years, I am of opinion that, with the above modifications, and having regard to the probable reduction in the price of the Company's gas 1d. per 1000 cubic feet, as foreshadowed in the speech of the Governor at the last ordinary meeting of the proprietors, the proposed amalgamation will be beneficial to the gas consumers in the borough."

The Borough Engineer reported as to clause 16 of the Bill as follows: "I beg to inform you that our relationship with the Gaslight and Coke Company has been very satisfactory; and I am not aware of any powers having been exercised by them to which we could raise any objection."

The Borough Electrical Engineer reported: "There seems to be nothing in the Bill affecting this department except that the Gaslight and Coke Company have a more vigorous selling department than the West Ham Gas Company, and the Corporation would certainly suffer from increased competition."

The Borough Treasurer reported as follows: "The preamble of the Bill alleges that the amalgamation of the Companies is to the advantage of the consumers of gas within the areas supplied by the two Companies. There is, however, a provision in the Bill for the reduction of candle power supplied in the Gaslight and Coke Company's districts which does not appear to be in proportion to the reduction in the standard price charged to the consumers; and it is therefore a question whether the amalgamation will be to the advantage of the consumers. The effect of the increase in the consolidated ordinary stock of the Company, due to the exchange of £118 worth of Gaslight Company's 4 per cent. stock for £100 worth of West Ham Company's 5 per cent. stock (clause 6) is dealt with under clause 30, together with the standard price and the reduced candle power. With regard to the substitution of £100 worth of West Ham Company's 5 per cent. preference stock by £125 worth of Gaslight Company's 4 per cent. stock, no difference is occasioned in the amount of profits required to pay dividends, as the bearing power is the same in each case. As to clause 7, relating to the issue of debenture stock, the same remarks as under clause 6, concerning the West Ham Company's preference stock, apply to the substitution of £100 worth of West Ham Company's 4 per cent. debenture stock by £133 6s. 8d. worth of Gaslight Company's 3 per cent. consolidated debenture stock. Clause 30 proposes to reduce the standard price of gas supplied from 3s. 4d. (the present price in the Gaslight Company's area) to 3s. 3d. in the new area; and at the same time clause 34 proposes to reduce the standard illuminating power supplied from 16 to 14 candles. The reduction in the standard price on a reduction in candle power is generally understood to be from ¾d. to 1d. per 1000 cubic feet for each candle power; and assuming that the value of the reduction of 2-candle power to the new Company is equal to 2d. per 1000 cubic feet, it would appear that the reduction in this clause of 1d. only in the standard rate of charge will produce a greater margin of profit available for dividends without the corresponding reduction in the authorized price charged to the consumer. The West Ham stockholders are entitled to more dividend on £118 under the new scale than on £100 under the old scale; and the funds required to meet this would appear to come from the Gaslight Company's stockholders, who are not entitled to as much dividend under the new scale as under the old. The new Company, however, would appear to be in a position to reduce the price to consumers in the Gaslight Company's area by the saving of 1d. in candle power, and so recover what is lost on the new scale. The old standard in the West Ham area was 2s. 11d. per 1000 cubic feet, and £5 per cent. dividend; but under this clause the standard proposed is 3s. 3d. and £4 per cent. respectively. From this it would appear that the West Ham stockholder under the old scale had to submit to a reduced dividend when the price charged was higher than 2s. 11d., while under the new scale the West Ham consumer can be charged over 3s. 1d. before the dividend is reduced below £4 5s. 4d. per cent., which equals a dividend of £5 0s. 8d. on the £118 allowed to West Ham stockholders."

Reporting generally on the Bill, the Borough Treasurer said: "From a perusal of the latest financial returns of the two Companies—viz., 1907—and allowing for a reduction in costs in proportion to the reduced prices since, against which is set the contribution to the reserve fund, &c., and increased responsibilities for a new bonus scheme, compensations, &c., it appears doubtful whether the present prices will be sufficient to meet the authorized dividends unless a considerable saving is effected on the reduced candle power or further reductions are made in the cost of manufacture. It is noted that at December, 1907, the two Companies had reserve funds amounting in total to about £78,578, apart from unappropriated profits. Apart from the clauses and general provisions of the Bill, attention may be called to the possibility of the West Ham Company's works being totally or partially closed. The rateable value of the undertaking in the borough is £18,117, and the effect of closing entirely would be a serious loss in rateable value. The use of the works for storage purposes only is very probable; and this would also result in a loss of rateable value. Further losses would also take place in either event, both in the rateable value of the properties occupied and the consequent reduction of employment for the workers. The increase of capital on the conversion of stocks arising out of the amalgamation of these two undertakings, both partially in the borough, will prove disadvantageous should the question of purchase be considered by the Local Authority in the future. As the Committee are aware, the Gaslight Company already supply the portion of the borough lying south of the Barking Road, the remainder of the borough being supplied by the West Ham Company, with the exception of a small part of Canning Town, which is in the area of supply of the Commercial Gas Company. It is a matter for the consideration of the Council as to the effect of the Bill upon the borough, having regard to the possibility that after the West Ham Company's undertaking is acquired by the Gaslight Company they would discontinue, in whole or in part, the manufacture of gas in West Ham, and possibly close the West Ham Company's works, except for the purposes of storage. This would entail a considerable reduction in the rateable value, and a large addition to the present number of unemployed workmen. The officials of the Gaslight Company have stated in the Press that it is not the Company's intention to close these works; and if this is correct, the matter could be settled by means of a clause inserted in the Bill."

It was resolved to present a petition against the Bill.

The Committee reported that they had adjourned the consideration

of the question whether it is desirable for the Corporation to endeavour to purchase the West Ham Gas Company's undertaking in order that they might obtain further information on the matter. They would later on report on the subject.

At a meeting of the Leyton District Council on Tuesday, the Clerk presented the following report: "By the Bill, power is sought by the Gaslight and Coke Company to purchase and take over the undertaking of the West Ham Gas Company, and to exercise the powers of that Company within the limits of supply. The statutory powers of the West Ham Company are, with a few trifling exceptions, absolutely repealed, and entirely new conditions are sought to be imposed with regard to the supply of gas in the district formerly supplied by the Company. It is proposed by the Bill to repeal the clause in the West Ham Gas Act, 1902, fixing the standard price of gas at 2s. 11d. per 1000 cubic feet, and a new clause is inserted fixing the standard price at 3s. 3d. Other clauses in the West Ham Company's Acts, relating to the quality, pressure, illuminating power, and testing of the gas supplied, are repealed, as are also provisions for appeal to Quarter Sessions in respect of the price charged for gas and relating to the supply of gas for public lighting. In many instances there is no indication in the Bill that adequate provisions are to be made in substitution for the obligations from which the Company will be released." It was resolved to present a petition against the Bill.

## SALFORD GAS SUPPLY.

### The Proposed Reduction in Candle Power.

To prove to doubting consumers the advantages which the incandescent has over the old flat-flame burner, Alderman Phillips, the Chairman of the Salford Gas Committee, arranged for a demonstration to take place at the gas-works last Friday evening; those ratepayers who had signed the requisition to the Mayor for a poll of the burgesses on the Corporation's proposal to reduce the illuminating power of the gas from 18 to 14 candles being specially invited to be present.

Alderman Phillips, before the practical test was proceeded with, made a short speech, in the course of which he repeated his arguments as to the advantages of the incandescent system, and impressed upon his hearers the fact that, in consequence of the increased cost of cannel, they must either pay more for their gas or acquiesce in the Gas Committee's suggestions for a reduced candle power. He again pointed out that nearly all the authorities and gas companies in the kingdom were adopting a lower candle power.

By means of two jets, the company were shown that the 14-candle power gas used with an incandescent burner gave more light than the 18-candle power gas in the ordinary flat-flame burner; it being also demonstrated that by the incandescent system there was less waste of light.

At the conclusion of the demonstration, a number of those present who had signed the requisition for a poll intimated their intention to withdraw their names from the list. It is very likely that the request for a poll of the ratepayers on the gas clauses of the Bill will not be persisted in. Mr. L. C. Evans, the Town Clerk, has taken Counsel's opinion on alleged irregularities in the drawing up of the requisition, and has, as a consequence, informed the signatories that, in the event of their insisting on a poll, they will have to defray the cost, which is estimated at about £700.

On behalf of the Gas Committee, the following official statement has been issued:—

> The gas now supplied is 18-candle power; but, as a fact, to keep a fair margin, as the Committee are liable to penalties, they supply nearly 20-candle power gas. Burnt in a flat-flame burner, the illuminating power is reduced to 12 candles, owing to the burner itself; and it burns 5 cubic feet per hour. But burnt in a mantle, the illuminating power is equal to 70-candle power gas, and only 3½ cubic feet of gas are consumed per hour. Consequently, on every 1000 cubic feet consumed there is a saving of 9d.; and the light is 70-candle power every instant it burns, as compared with the flat-flame burner of 13 candles. The 9d. saved on every 1000 cubic feet will buy fittings and mantle included; for a complete outfit is sold at 6½d. But as the fitting lasts for a very long time, with ordinary care, there is nothing more to buy after the first cost except mantles, which cost only 2½d. each. Consequently, every 1000 cubic feet saving 9d. will buy three mantles, and still be a saving. But, as a matter of fact, nothing like this number will be required, more particularly if users will learn to keep their gas-fittings clean. Moreover, with the incandescent burner, the gas is more completely consumed inside the mantle; so that from a health point of view the gas is superior in every way.

**Filtration of the Paignton Water Supply.**—The Paignton District Council had under consideration at their meeting yesterday week a recommendation of the Water Committee that three filters be purchased from the Candy Water Filter Company at the cost of £425 each, and that application be made to borrow the necessary money. Mr. Parnell, the Chairman of the Committee, said the need for this outlay could not be foreseen when the new water-works were established. By their Act of Parliament, they were liable to a fine of £10 a day for sending out water not sufficiently hardened to be free from plumbism. The provision originally made for filter-beds was considered ample by the Engineers; but only experience could show what amount of water could be sufficiently filtered and hardened. There was difference of opinion as to the hardness necessary. The matter had given a great deal of trouble to the Committee, who were anxious to avoid additional expense. The Candy filter apparatus could be quickly laid down; and if it proved effectual their filtration system would be better than before, and would be also more economical. The Chairman (Mr. W. J. Ham) said the experience of the past few months had shown that it was absolutely necessary to treat the water in the way proposed. The recommendation of the Committee was adopted.

## THE FATAL GAS EXPLOSION IN BERMONDSEY.

### Resumed Inquest on the Second Victim.

The inquiry into the circumstances attending the death of George Henry Langley, which occurred in Guy's Hospital on the 2nd ult., as the result of injuries caused by the explosion in Grange Road, Bermondsey, on the 30th of December, was resumed by Dr. F. J. WALDO, the Coroner for the south-eastern district, last Thursday, having been adjourned from the 20th ult. (see *ante*, p. 259).

Mr. CLAVELL SALTER, K.C., M.P., appeared for the South Metropolitan Gas Company; Mr. J. W. GODFREY represented the London County Council, and Mr. T. B. SHAW the Metropolitan Water Board; Mr. F. RYALL, the Town Clerk of Bermondsey, was in attendance for the Borough Council.

The CORONER, in opening the proceedings, stated that since the last sitting he had been approached by the South Metropolitan Gas Company and the London County Council, who had asked him to subpœna four more witnesses; and this had been done. There were now 30 or 40 witnesses in all.

Mr. GODFREY said these new witnesses were to be called as to a matter of fact—*i.e.*, as to whether or not a naked light was used in the excavations. The point had been raised by the Gas Company.

Mr. CLAVELL SALTER said this was not so. The Company had been attacked, and they had to defend themselves.

*Susan Sweetting*, the wife of a labourer living in Grange Road, said she was visiting at No. 39 in the road on the night of the accident, and saw three men opposite the house standing near a hole. One of them was holding a piece of rope which was alight at one end. Ten minutes later the first explosion occurred.

*Florence Gill*, living at No. 40, said she noticed, when going home before the explosion, two workmen in the road. One was digging, and the other was holding what she thought was a lamp; but the night was misty. She looked out of the window later and saw two lights; the second being similar to the first. Soon afterwards the explosion occurred.

In reply to Mr. GODFREY, witness said she was three-quarters of an hour in the house after noticing the first light, and anything might have happened in the meantime without her seeing it.

*George W. T. Cannon*, who was with the last witness, described the light they saw as an "electric hand-flare;" but he accepted the definition of it as an "electric box light," on the ground.

Dr. *Martin*, of 45, Grange Road, said Mr. Hazel (who gave evidence on a previous day) told him, the morning after the explosion, that he was passing the excavation in Grange Road on the previous night, with his wife, and that she called his attention to the workmen who were swinging a "lighted tarred rope" about, which she described as a "very funny thing to do."

*John Metheringham*, a foreman in the employ of the Gas Company, said he visited the scene of the explosion at midnight. They started excavating, and there was immediately a rush of gas and water to the surface. The concrete and stones gave way, and they discovered a large cavity 6 feet deep, and extending right under the footpath. He descended with an electric torch, and found the 5-inch gas-pipe connecting the mains on either side of the road broken near the middle. It had sagged, and was resting on the brickwork of the old sewer shaft; there being no soil to support it. He also found the 4-inch spur from the 9-inch water-main near the Alaska Works broken off, and lying about 6 inches from the main. The main-pipe had subsided about 2 inches. There was also a hole 2 feet square in the brickwork of the old sewer. He had not formed any opinion as to the cause of the explosion.

In answer to Mr. SHAW, witness denied that, wherever there was an air-shaft leading to the old sewer, cavities existed similar to the one he had described.

*William Henry Cupit*, a district foreman in the employ of the Gas Company, said he visited Grange Road immediately after the explosions, and found gas escaping from the manhole in front of No. 22; a piece of the main having been blown clean out. He found the same thing at Page's Walk. By the Alaska Works, large volumes of gas were coming up from a water-hydrant box. Describing the fractured "rider" pipe, he said there was a 3-inch slit in it, so that one part of the pipe sagged below the other. It was a fresh break, because the broken edges were still bright. In another part of the pipe there was a small fracture, which might possibly have been caused by the escaping gas. He had seen the broken spur of the water-main, and was of opinion that this was the cause of the trouble. The escaping water had worked down the old sewer the earth supporting the "rider," leaving it without support. He also saw in the cavity a water mark considerably above the level of the water-main, indicating the spot to which the water had risen.

Replying to Mr. SHAW, witness said it did not follow that the explosion which blew out the gas-pipes must necessarily have caused a leak in the mains. As to the "rider," he put it down himself twenty years ago. There was no cavity then, the ground being quite solid.

The CORONER questioned the witness as to the arrangements made by the Gas Company to meet cases of emergency, and suggested that a breakdown gang should always be in readiness.

*Witness* was understood to reply that it was scarcely practicable, as such accidents as the one being inquired into were of rare occurrence, and the expense would be disproportionate.

After the mid-day adjournment,

The CORONER suggested that the next witness should be the Bermondsey Borough Surveyor.

Mr. *Robert John Angell*, the Borough Surveyor, then gave evidence. He said that he was called to Grange Road about a quarter to nine o'clock on the night of the explosion, and found there was a strong smell of gas in the neighbourhood of the Alaska Works. The manhole cover at the extreme end of the road had been blown away, and a series of explosions took place opposite Messrs. Hepburn, Gale, and Ross's premises. There were also explosions opposite Nos. 39, 40, and 52, and gas alight was coming out of a hole nearly opposite the Alaska Works. The surface of the road was completely cracked from the Mason's Arms to Tower Bridge Road. A large cavity was formed

in the road between Barrow's Yard and the Alaska Works—in fact, no part of the surface there would have remained but for the tram-lines, which were 9 inches deep and acted as girders. There were a number of water marks in the cavity, showing the water had risen several times to find its level while percolating through the loose sand at the bottom of the cavity. He had seen the broken spur of the water-main, and had tried to fit it to the 4-inch shaft of the main from which it was detached; but he could not do so, as the main had sunk from its original position. This was the cause of the break. His opinion was that the water escaping from the main at the broken spur had washed away the soil supporting the "rider" gas-pipe. It had also percolated the joints of the old sewer, which were very wide, and caused the brickwork to collapse; thus washing the soil into the sewer. The gas-pipe then gave way, and the escaping gas got into the old sewer, coming up through the side entrances. Witness further explained that the drain-pipes from the houses in the road were carried right through the old sewer and concreted in, and that the explosion blew away the concrete blocks. He found one block, weighing about 1½ tons, had been blown a distance of 8 yards. After this the gas made its way into the exposed branch pipes, and caused explosions such as occurred at the Mason's Arms. In concluding his evidence, witness said the old sewer was one that had been abandoned by the London County Council; and he considered it a source of great danger and nuisance, on account of bad gases and smells coming from it.

Witness was cross-examined at some length by Mr. GODFREY and Mr. SHAW; and the inquiry was then further adjourned until to-day.

## SHERINGHAM GAS AND WATER PURCHASE.

### Ratepayers Vote against the Bill—A Poll to be Taken.

A meeting of ratepayers was recently held at Sheringham to consider the Bill which the Urban District Council proposed to promote in the next session of Parliament for the transfer of the local gas and water undertakings to the Council, and for other purposes. Out of about 300 who were present, only some 100 voted; and of these there was a majority of three to one against the Bill.

The meeting was presided over by the Rev. J. S. Barford, the Chairman of the Council, who explained that Mr. E. H. Stevenson was present as their expert adviser, and would be prepared to answer any questions that might be put to him. It fell to him (the Chairman) to explain why the members of the Council felt that the resolution approving of the Bill should be adopted. In the first place, in order to make his meaning plain, he would ask them to take a hypothetical case, and to treat the figures in that light. Proceeding on this assumption, he asked them to consider that it was desired to obtain by agreement, or failing that by arbitration, with the private Company, an undertaking at (say) a purchase price of £40,000. If they were to borrow this sum for 45 years at 3½ per cent., the annual payments would work out at £1790. In the case he was putting before them, the net revenue of the Company was £1820. If that were so to the Company, it was worth a great deal more to the Council; for there would be the saving effected by having no Directors' fees to pay or separate offices to keep, as the work could be done in the offices which already existed. It would be consequently fair in this case to put the net revenue to the Council at £2000. So far, therefore, there would be a gain of £210 to the rates. But then they would have to pay the cost of the Bill; and the payment for this would only be allowed to extend over five years. The cost in this imaginary case he put down at £1500; and with interest at 4 per cent., the annual charge on the rates for the cost of the Bill would be £330. This was all on the assumption that they did not get any increase of revenue at all in that period. So, looking at it at the worst, the result would be that in the first five years they would lose £120, and for the next forty—without any increase—they would gain £210. At the end of the forty-five years, the purchase-money would have been paid off, and they would have the whole of the profits. Now what about the cost of the Bill? On that he would not put things in any rosy light. They had been informed by their Parliamentary Agents as to the probable cost of an unopposed and also of an opposed Bill. They had in making their calculations just doubled the amount indicated. In the event of going to arbitration, the expenses so incurred would be spread over the forty-five years' period of the purchase-money repayment. Supposing, for instance, it was found that the concern was in need of immediate improvement, then it followed at once that the purchase-price would be lower. Assuming urgently needed improvements were required in the next few years, they might put down a sum of (say) £5000, which their expert adviser would confirm was a very fair margin indeed. This they could borrow for thirty years at 4 per cent. It came to this—that in the crucial five years, with no increase of revenue, they would have an extra rate of 3d. in the pound; but at the end of the forty-five years the community would benefit, on their calculation, to the extent of a profit equal to 2s. in the pound. The Council had been receiving complaints both as regarded the gas and the water; and on grounds of health and good sanitation they had been compelled to proceed when other efforts to obtain improvements had been abortive. He concluded by moving to approve the Bill.

Mr. H. R. Johnson (Vice-Chairman of the Council), in seconding the motion, said that to him the matter of the purchase of the gas and water undertakings appeared to be one of now or never. In his opinion, the arbitrators would not take into account what the Company might have spent, but would base their decision on the net revenue of the concern. He was pleased to see that the only opposition before them that night was on financial grounds. When they saw what the net profits of the Company were, it was certainly not a bad concern that the Council wished to take over. The Council had had many complaints about the mismanagement of the undertaking, and of the bad smells coming from the gas-works. The Council's expert adviser told them that this nuisance could be remedied, and that without shifting the works. The only reason suggested why the works should be shifted was in anticipation that if the Council took them over the business of the undertaking would increase enormously. He thought that in a matter of this kind they might very well compare Sheringham with a place about the same size, such as Hunstanton, where the gas and water undertakings had passed out of the hands of a private Company. From a report before him, he saw that the Hunstanton works were acquired by the Local Authority at the end of 1897. The quantity of gas sold at that time was about 4 million cubic feet, and the price was 5s. per 1000 feet. In the financial year ending March 31, 1908, the quantity of gas sold was nearly 15 million cubic feet; the undertaking having trebled in size. The price was reduced to 4s. 2d. per 1000 feet after three or four years; and the following year to 3s. 9d.

Sir Edmond Bainbridge thought that, whether they approved or disapproved of the Council's proposals, each side would be ready to credit the other with endeavouring to act in the best interests of the place. It was, he had to admit, a very difficult matter to follow the Chairman, taking as he had skeleton figures. He would not say one word about the morality of a transfer under which the Vice-Chairman had said they had the opportunity of taking this property from the owners at a loss to them but a gain to the Council. It might be all right; but to his mind it was not moral. The Chairman had gone in for forty-five years and more. He, on the other hand, reckoned on borrowing for a period of thirty years. He had received a letter on the subject from Sir Forrest Fulton, who, writing from London, said: "I have come to the conclusion that we ought vigorously to oppose the Bill promoted by the Urban District Council for acquiring the gas and water works. The scheme is sure to be opposed in both Houses of Parliament; and the expense would be very great, and a heavy burden upon the rates. I do not think we should be successful; and if we were, I think it would be a great calamity. We cannot in so small a place rely on getting nine thorough men of business with sufficient practical experience to manage so large an undertaking. I do not think there is much fault to find with the water supply; and though the gas is bad, and the works are in the wrong place, we can bring pressure to bear on the Company to remove the gas-works to a more suitable site. Of course, if beaten on a show of hands, you will demand a poll, We are just getting the rates down; let us keep them down."

Several other speeches were made before the motion was rejected—26 voting for it and 72 against.

## THE EIGHTY-CENT GAS LAW IN NEW YORK.

When referring to this matter in the last number of the "JOURNAL" it was mentioned that the decision of the Supreme Court of the United States was given in the form of a memorandum by Justice Peckham, who heard early in November the arguments in the appeal by the Consolidated Gas Company. The following is the text of the judgment.

1. At the time of the consolidation, the value of the franchises of the constituent Companies was fixed by them at $7,781,000; and this amount formed part of the capital of the complainant for which it issued stock. The consolidation was effected pursuant to the State Statute, and the State has never questioned the validity or fairness of the valuation. Since the consolidation, the stock so issued has been dealt in up to the present time as valid stock of the Consolidated Company, capitalized pursuant to the Statute at not more than the fair aggregate value of the property, franchises, and rights of its constituent Companies. The State should not now be heard to question the value of the franchises at the time of the consolidation. The method of arriving at the value of these kinds of franchises, and how they should generally be tested in the fixing of rates, are questions not now before the Court, and are left undecided. The case before the Court is decided upon its own peculiar facts.

2. The estimated increase in the value of these franchises as made by the Trial Court at the time of the commencement of this suit is only an estimate, and is not based upon evidence sufficient to warrant the finding of any increase whatever over the amount agreed upon at the consolidation.

3. The evidence leaves it in doubt whether the value of the property used by the Company in its business is as great as found by the Trial Court after reducing the value of the franchises to the sum agreed upon at consolidation.

4. But taking the value as found by the Court, after reducing the value of the franchises, the result gives a return of almost 5½ per cent. A reduction in the value of the real estate, plants, &c., of a small amount only, would bring the return to, if not more than, 6 per cent. A possible increase in the consumption of gas would probably increase the earnings of the Company without a corresponding increase of cost. Under all the circumstances, the complainant has failed to make out its case with that degree of clearness necessary to warrant the interference of a Court of Equity before an actual and *bonâ fide* test has been made under the practical operation of supplying gas at the rates mentioned in the Statutes.

5. There is no rule as to any particular rate which any corporation subject to legislative control in the matter has a right to obtain without legislative interference. It depends upon circumstances and locality. In this particular case, with reference to the risk attending the business and the locality where it is carried on, the complainant is entitled to a return, if it is possible, of 6 per cent. upon the fair value of its property actually used in its business of supplying gas.

6. There is no discrimination between the individual consumer and the city by fixing the price of gas for the city at 5c. per 1000 cubic feet less than is permitted in the case of individual consumers, so far, at least, as the complainant is concerned. If the amount obtained from the total gas sold to the city and the individual is enough to secure the requisite return upon the property, it is all the complainant can require; and the question of discrimination between city and individual is one in which the complainant can have no interest.

7. The rate proposed must be with reference to the value of the property at the time when the rate takes effect. The Company is entitled to the benefit of any increase in value at that time. This, at least, is the general rule; and if there be any exception to the rule, this case does not come within it.

8. Any increase in the expense arising from the increased candle

power of the light demanded by the Statutes was included substantially in the expenses of the year (1905) with reference to which the inquiry was made.

9. The provision in the Acts requiring a certain pressure is unconstitutional. The proof unquestionably shows great possible, if not probable, danger of explosion in the mains or other pipes if the pressure demanded were applied to them as they now are. To eliminate such danger would require strengthening all the mains and other pipes, which would involve an expenditure of many millions of dollars, upon which no return could be obtained at the rates prescribed by the Acts. The provision can be separated, however, from the rest of the Statute and the balance made valid. The pressure must be sufficient to produce a light of the candle power mentioned in the Acts.

10. If the Court below is right in its construction of the penalties, as to the amount, &c., such penalties are void, but are separable from the rest of the Acts, and the balance can be effectually carried out.

11. This is not a case for the valuation of goodwill. The complainant has, in fact, a substantial monopoly of the gas business in the City of New York, and those who wish to use gas must take it from the complainant. In this case, as there is no possibility of competition, there should be no allowance for goodwill.

12. As it may possibly be that a practical experience of the effect of the Acts by actual operation under them might prevent the complainant from obtaining a fair and just return upon its property used in its business of supplying gas, the complainant, in that event ought to have the opportunity of again presenting its case to the Court. Therefore, the decree is reversed with directions to dismiss the Bill without prejudice.

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We learn from "Progressive Age" that, in reply to a question put to him as to the effect of the decision, Mr. J. M. Beck, a member of the legal firm who conducted the Company's case, made the following statement: "It is obvious that the Supreme Court has sustained the Consolidated Gas Company in most of its principal contentions. Thus the Supreme Court holds that the Company is entitled to a return upon its franchises, and simply questions the method of their valuation. As the decision expressly permits further proceedings to determine the confiscatory character of the law, the Company will have further opportunity to establish the true value of its franchises. The Court holds that the Company is entitled to a full return of 6 per cent. upon the value of its property, as contended for by it. The City and State had urged that the Federal Courts were powerless to interfere if the law permitted at least 3 to 5 per cent.; but the Supreme Court leaves no doubt that if, in the subsequent proceedings which it permits, the Company can establish that it received less than 6 per cent., the Statute would be unconstitutional. Another point of great importance is the ruling that the Company is entitled to a full return on the present value of its property, and is not restricted to its original cost. The Court also declared the pressure provision to be unconstitutional, and has invalidated the cumulative penalties. With these important rulings definitely settled in the Company's favour, it is given the opportunity to establish, by the actual results of the operation of its works since the Eighty-Cent Gas Bill was passed, that such rate yields less than 6 per cent. upon the just value of its property; and the Company entertains no doubt as to its ability to establish this to the satisfaction of the Court and the public."

The views of the other side may be gathered from a statement made by Mr. W. P. Burr, the Counsel who appeared on behalf of the City and the State. He regards the result as a "splendid victory," and is of opinion that the Company will accept the decision, and not go into Court again—the excess collections being refunded in accordance with directions to be subsequently announced. At the same time, he acknowledges that the Company have the option of going into Court after they have made a trial of 80-cent gas. He says a decision of the Supreme Court in such a case would be regarded as final, and for this reason the Court has specially given its decision "without prejudice," so that the Company might, if it should be proved that they could not carry on business at a reasonable profit under the law, have the privilege of proving the facts by actual experience. The Company valued their property at $100,000,000; and the Master in Chancery (Mr. A. H. Masten) before whom the first hearing came, reduced this to $83,000,000. Judge Hough, to whom the report of the Master had been made, further reduced the figure to $59,000,000. Now the Supreme Court has reduced the figures to $47,831,000, with an added allowance for the value of the Company's franchise of $7,781,000—bringing the total valuation to $55,612,000. This franchise valuation was what was left of the Company's valuation of the franchise at $20,000,000, which the Master in Chancery had reduced to $12,000,000. According to Mr. Burr, the Supreme Court specifically rules that $7,781,000 was the value of the franchise as given and provided for by the law of New York at the time the consolidation was effected in 1884, and that as this value had been fixed and accepted under a law of New York, it could not be interfered with. Mr. Burr points out that the Court took cognizance of the fact that every reduction in the price of gas had resulted in an increased consumption, and that since the reduction to 80 c. their business had increased 1000 million cubic feet a year; while, as they had practically a monopoly, their business would normally still further increase.

Referring to the decision in this prolonged litigation, "Progressive Age" says: "If the Company accepts the result, it will still have on its hand many vexatious problems—those pressing matters of every-day occurrence, questions concerned in extensions and betterments. These must be provided, not alone to properly care for existing demands, but for the rapidly increasing population to which the Company caters as well. New York City is growing at a tremendous rate. The increase in population during the past five years has exceeded 17 per cent.; and to adequately provide for these demands alone means careful foresight. But if gas is to be had for a paltry 80 c., the Company which now no doubt holds the "banner record" for sales—nearly 10,000 cubic feet per capita—will be called upon to expend vast sums of money for both labour and material. But in addition to this, and probably the most difficult problem of them all, is that of finding men of the calibre to successfully carry on the work when the time shall come for those who have so long done battle for the Company to seek permanent respite from always arduous efforts. These officials have made a gallant fight; and in conducting it they have exhibited honest intentions and endeavours to conserve what they believed to be the rightful emoluments of their stockholders. The efforts which have been put forth in this litigation have been watched with the closest attention by the corporations throughout the country engaged in the lighting business; and it is indeed fortunate that the defendant in the case had not only the financial ability to support the contest, but the spirit and determination to stand up for what it believed an invasion of its rights. Unfortunately, the very opposite has been, in some particularly important instances, the course pursued when gas companies have been assailed."

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## PUBLIC LIGHTING OF WEST HAM.

### Preference for Gas Maintained by the Corporation.

At the Meeting of the West Ham Corporation last Tuesday, tenders received for the lighting and maintenance of the public lamps within the borough for five years were under consideration. They were as follows: West Ham Gas Company: Ordinary lamps, £2 11s. 8d. each per annum; special three-burner lamps for tramway routes, £11 12s. 7d. each per annum. Gaslight and Coke Company: Ordinary lamps, £2 11s. 1d. per lamp per annum, subject to a special proviso that the number of lamps covered by the contract should not be decreased except for some reason other than the substitution of a different illuminant. Commercial Gas Company: £2 9s. per lamp per annum (as at present). The Corporation Electricity Department submitted a tender in respect of streets in which electric mains or ducts exist or may eventually be laid; their figures per lamp per annum being as follows: Lamps of 50-candle power, £2 9s.; lamps of 100-candle power, £3 15s; lamps of 200-candle power, £6 10s. It was specified that for the conversion of the existing gas-lamps for electric lighting an additional charge of 28s. per lamp would be made; and that the price for 50-candle lamps would only apply to the existing incandescent electric lamps in the event of the tender being accepted for additional lamps.

The Committee recommended that the tenders of the respective Gas Companies should be accepted; but that the Council should not agree to the special condition suggested by the Gaslight and Coke Company. Attention was directed to the fact that by the agreements entered into with the Companies, on the Committee's recommendation, in 1903, the gas lighting bill had been reduced from a figure of £10,635 to £8015 per annum—a saving of £2620 per annum, notwithstanding the fact that, owing to the development of new estates, &c., 110 additional lamps had been erected. It was further mentioned that the payments for the new lanterns and fittings installed by the Companies, under the terms of the agreements, to replace the old-type lanterns and flat-flame burners, would be completed by the payments due at the end of March; and that the total expenditure under this head would be about £5000, or at the rate of £1000 per annum during the period of the agreements. The terms that the Committee now recommended would, it was stated, effect a further saving of about £560 per annum on the gas lighting account. In other words, the account, with an additional 110 lamps, will now be about £7455 per annum, against £10,635 in 1903 under the old flat-flame system.

On the motion for the adoption of the report and recommendation, Mr. Croot moved, and Mr. Reed seconded, an amendment to the effect that electric lamps should be put up in three blocks of streets where electric mains have been already laid. Mr. Hutt, in opposing, said that if the amendment were carried the Corporation would practically scrap their incandescent lamps. Were they to bolster up the electricity undertaking by expenditure of this character? The amendment was negatived by 23 votes to 11. Mr. Hurry moved a further amendment to delete the words with reference to having a five-years' contract with the Gas Companies. He argued that it would be unwise to do as suggested at the present time, when the Gaslight and West Ham Companies were to amalgamate, as the contract with the Council would be reckoned among the assets of the concerns. This amendment was not seconded. The motion was then put and carried.

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**Costs of the Criccieth Water Act.**—At the meeting of the Criccieth Town Council on Monday last week, the Chairman of the Finance Committee (Mr. Watkin) stated that the cost of obtaining the Act of Parliament in connection with the water scheme was £2276; and the costs of the arbitration award, including the amount paid to the Water Company, were £6168, apart from the accounts yet to come in, which did not include the estimated cost of the new water-works contract. The Clerk said the costs of the Act were much more than had been anticipated owing to the way in which they were treated by the Chairman of the Parliamentary Committee, for they had to visit London three times, instead of once as expected, The expenditure in excess of the estimates was stated to be £417.

**Hitchin Water Supply.**—The water supply of Hitchin is being augmented by the construction of a concrete service reservoir to hold 300,000 gallons. It is about 80 feet square and 8 feet deep. It will be covered with a brickwork roof supported by 54 piers. The work now in hand includes a water-tower to carry a tank of 98,000 gallons capacity, the lining and covering of a well, and the laying of about 1700 yards of pumping and distribution mains. The augmented supply will provide 200,000 gallons per day, sufficient for two days' supply at the rate of 20 gallons per head of the population. There is a copious supply of water flowing from a 12-inch borehole in the chalk, which will gravitate from the well, situated at Charlton some 2000 yards away, through a 12-inch main to the existing surface tanks at the pumping-station in the town. The supply from the well is really equal to double the present requirements of Hitchin. Provision is made at the site of the new works for the construction of another reservoir of about the same size, should the addition be required. The work has been designed by Messrs. W. R. & W. Phillips, of Luton.

## SALFORD ELECTRICITY UNDERTAKING.

### Resignation of the Chairman and Members of the Committee—The Alleged "Secret" Contracts.

Members of the Electricity Committee of the Salford Town Council have disagreed repeatedly of late on questions of policy; and one result has been the resignation of the Chairman (Mr. W. H. Barrett), followed by that of Alderman Rudman and Mr. Hailwood, members of the Committee. Other resignations are pending; and at the moment it looks as if the Committee will have to be reconstructed, such is the difference of opinion existing among the present members.

It is an open secret that at recent meetings of the Committee there have been some heated discussions, with an exchange of personalities that has brought about the present rupture. One subject which has given rise to these wranglings in committee was the decision to have preferential terms for certain consumers of electricity. At a recent Local Government Board inquiry, it was alleged that the Committee had entered into what were described as "secret" contracts with different people; the further charge being made that, as a consequence, the Department was supplying current actually at a loss to some concerns. At the January Council meeting, the policy of the Electricity Committee came in for criticism during a discussion on the question of the publication in the *agenda* of particulars of contracts entered into by the different Committees, but more particularly those in the Gas and Electricity Departments. It was at this meeting that Mr. Wheatcroft declared the Electricity Committee had "sinned by establishing secret agreements for preferential charges;" but Mr. Barrett, as Chairman, denied that the Committee had either secret agreements or preferential customers. What they did have, he said, were "preferential charges." The Council at that meeting appointed a Special Committee to consider the whole question of these contracts, and the publication or otherwise of the details. This Committee have not yet reported; but it is pretty certain that the present trouble in the Electricity Committee has arisen in consequence of the inquiries which followed upon the appointment of the Special Committee.

The Mayor of Salford (Alderman Jenkins) to whom the resignations were tendered, has handed them over to the Selection Committee, with a view to their being finally brought before the Council. An effort is being made to get Mr. Barrett to reconsider his decision to resign. Even those who do not see eye to eye with him in regard to the working of the Electricity Department recognize that he has rendered valuable service in his position as Chairman, and express the hope that he will continue in office—accepting the decision of the Council, whatever it may be, on the vexed question of preferential charges.

## METROPOLITAN WATER BOARD.

### The New Reservoirs—A Surcharge.

The first Meeting of the Board after the Christmas recess was held on Friday—Mr. E. B. Barnard, M.P., in the chair. The Works and Stores Committee presented a long report on the subject of the cost of the Honor Oak reservoirs, and recommended that an estimate of £37,850 submitted by the Finance Committee be approved, and that authority be given to incur expenditure not exceeding this amount in respect of the completion of the reservoirs. The total expenditure by the Board on this undertaking would be £198,000, of which £160,000 (the original estimate) had been approved. The Chairman of the Committee (Mr. C. E. Hearson) stated that the reservoirs would be the cheapest ever built. The recommendation was adopted.

The Finance Committee reported that the District Auditor (Mr. A. Carson Roberts) had presented his report on the accounts of the Board for the financial year ending March 31, 1908, and had disallowed an item of £59 16s. 4d., the costs incurred in connection with the ceremony on the occasion of the opening of the Walton reservoirs, and had surcharged the amount upon the members of the Committee who signed the order for its payment. They said four courses were open to the Board with regard to the surcharge: (1) The amount disallowed to be paid by the members surcharged; (2) the question of the validity of the disallowance and surcharge to be taken to the High Court; (3) application to be made to the Local Government Board, in lieu of the High Court, to inquire into, and decide upon, the lawfulness of the reasons stated by the Auditor for the disallowance and surcharge; and (4) formal consent to the surcharge, and its remission to be sought from the Local Government Board. The Committee thought the Board would wish to have the validity of the surcharge decided by the High Court; and they therefore recommended that application should be made for a writ of *certiorari* to remove the question into the Court, and that the Law and Parliamentary Committee be instructed to take the necessary steps in the matter. The Chairman of the Committee (Lord Welby) mentioned, however, that they were by no means unanimous in arriving at the recommendation; and he suggested that the Board should go to the Local Government Board to inquire into the lawfulness of the surcharge. Mr. L. Smith remarked that it was undignified for the Board to expect the ratepayers to pay for refreshments on these ceremonial occasions; and Mr. W. Burns expressed the opinion that, after the experience of Poplar and Mile End, the less the Board had to do with refreshments the better. Eventually the recommendation was rejected; and it was agreed to refer the question to the Law and Parliamentary Committee for consideration.

The return relating to the supply of water for the month of December showed that the average daily quantity sent out was 212,965,000 gallons. The number of houses, &c., supplied was 1,086,221; the estimated population being 7,034,196. The mean supply per head per day was 30·2 gallons, compared with 29·5 gallons in the corresponding month of 1907. The total quantity of water in store in impounding reservoirs at the end of the month was 7422 million gallons, against 5826 millions at the end of December, 1907.

## EXMOUTH WATER SUPPLY.

### Trial Boring to be Continued.

The difficulties which have been caused at Exmouth by the adverse vote of the ratepayers on the question of the Water Bill were discussed at a special meeting of the Urban District Council yesterday week. Mr. J. E. Daw, the Chairman, said that while the smallness of the majority against the Bill showed that there was no overwhelming feeling on the subject in the town, the Council were placed in a position of grave difficulty. He moved a resolution to the effect that he, with the Chairman of the Water Committee and another member, should be authorized to visit London and lay the whole matter before the Local Government Board. Mr. Perry, who supported the resolution, said that if the poll could take place in the light of present knowledge, a large majority would be recorded for the Bill. The Rev. O. J. Reichel, who has taken a leading part in the movement against the Council's proposal, said that though many people seemed to be of opinion that the opposition should be dropped, in view of the prospect of getting water from the boring at Dolton, this was not his view. He had been informed by people of experience that they should stop boring now that they had come to quicksand; and a gentleman who had made a boring on the other side of the river had found the water quite unsuitable. Mr. Tupman remarked that it was a question whether the Engineers and Geologist advising the Council were right or whether Mr. Reichel was; and they could not decide this yet. The resolution was carried with two dissentients.

At another meeting on Thursday, the Chairman reported that he and Mr. Abel had had an interview on the previous day with two officials of the Local Government Board. They learnt that, having regard to the provisions of the Borough Funds Act, it was impossible to proceed, and that though the adverse majority was only 3, the Bill must be abandoned, and the costs incurred in its promotion be paid out of the rates. The next question to be considered was whether or not they should continue the trial boring. If the boring was discontinued, the whole cost would have to be paid out of the rates, without any possible advantage to the town; whereas if they continued up to the point where test pumping would show conclusively whether the yield of water would be sufficient in quantity and good in quality, they would be in a position to proceed if the ratepayers should decide to utilize the water, and the cost might then be provided out of a loan. Mr. Abel and he also had an interview with Messrs. Hill and Sons, who were very sanguine of the results to be obtained from the boring, and were strongly of opinion that the only practical course was to continue it until the time arrived for making a pumping test. They thought that, if this test was satisfactory, and could be maintained during the next few weeks, it might be possible, should the ratepayers approve, to apply to Parliament, so as to endeavour to utilize some of the results of the costs already incurred, and avoid a further year's delay in carrying out the water scheme. If this could not be done, no further proceedings could be taken until next year. He therefore proposed that the trial boring be continued until the Engineers reported that a conclusive pumping test could be made, and that such test should be then proceeded with, and the result reported by the Engineers to the Council. The Rev. O. J. Reichel considered this would be a waste of money. The resolution was, however, adopted by a large majority.

## MODEL CODE OF WATER REGULATIONS.

In the "JOURNAL" for Jan. 19 attention was directed to a pamphlet lately issued by the Joint Committee on Water Regulations, which, it may be remembered, was formed some time ago on the initiative of the Plumbers' Company, giving an account of their work, and submitting for general adoption the following model code of bye-laws and regulations for the prevention of waste, contamination, and misuse of water.

*Operation of Bye-Laws and Regulations.*

1.—These bye-laws and regulations shall come into operation on the day of , 19 , and shall remain in force until amended in accordance with the Act, notice of such amendment being published in two or more newspapers circulating in the district of supply as hereafter defined. The schedules attached hereto and respectively lettered A, B, C, D, and E, shall be read with, and be deemed to form an integral part of, these bye-laws and regulations.

*Definitions.*

2.—In these bye-laws and regulations and the schedules attached thereto, the following words shall have the meanings herein defined, namely:—

(*a*) The term "*authority*" shall mean and refer to the * . . . . . acting as a body corporate under their common seal, *or by a Committee or Board, or Board of Directors*, or by an authorized officer (as hereinafter defined) duly appointed for the purpose.

* *Note.*—Here it is intended to fill in the name of the authority, and the words in italics would be modified accordingly.

(*b*) The term "authorized officer" shall mean and refer to the Water-Works Engineer, Inspector, or any person appointed by the *authority* for the purpose of administering any of these bye-laws and regulations.

(*c*) The term "consumer" shall mean and refer to any corporate body, person, or persons supplied or applying to be supplied with or using the water of the *authority*, or any person or persons otherwise liable for the payment of the water rates or rents.

(*d*) The term "supply-pipe" shall mean and refer to the pipe which extends from the main of the *authority* up to the ball-tap of the supply cistern, if any, and any consumer's pipe subject to water pressure from the main of the *authority*.

(*e*) The term "distributing-pipe" shall mean and refer to any consumer's pipe which is not subject to water pressure from the main of the *authority*.

(*f*) The term "stopcock" shall mean and refer to any tap controlling the supply of water of the *authority* to any premises charged or chargeable separately with water rate or rent.

(*g*) The terms "consumer's pipes" and "consumer's fittings" shall include and refer to all pipes and fittings respectively used in connection with the supply of the water of the *authority* which are not the property of the *authority*.

(*h*) The terms "district of supply" or "limits of supply" shall mean and refer to the area within which the *authority* is empowered to supply water under any General or Special Act, or Provisional Order confirmed by Act of Parliament.

(*i*) So far as may be reasonably consistent with the definitions herein given, terms used in these bye-laws and regulations shall have the same meanings as the same terms have when used in the General and Special Acts or Orders referred to.

*Application for Supply.*

3.—Before commencing the laying, alteration, or extension of any consumer's pipe, or otherwise on applying to the *authority* to provide a supply of water to any premises, intending consumers shall fill up, sign, and deliver to the registered office of the *authority* an application in the form prescribed in Schedule A, attached to these bye-laws and regulations, or as otherwise required by the *authority*.

*Connection to Mains of Authority.*

4.—Consumer's pipes shall be laid *and connected to the mains of the authority** in accordance with the Water-Works Clauses Act, 1847, section 44, and with these bye-laws and regulations.

* *Note.*—The words in italics may be omitted in cases where the connection to the main is made by the authority in accordance with bye-law 7.

*Alteration or Removal of Consumer's Pipes and Fittings.*

5.—No consumer's pipes or fittings shall be removed, altered, or extended except in accordance with the provisions of the Water-Works Clauses Acts, 1847, section 51, and 1863, section 19.

*Provisions Relating to the Prevention of Waste, &c., of Water.*

6.—Every consumer shall be subject to such provisions of the Water-Works Clauses Acts, 1847 and 1863, and of any Special Act of the *authority*, as may apply to the prevention of waste, contamination, or misuse of the water of the *authority*, including the access of the authorized officer to the consumer's premises, pipes, and fittings.

*Supply-Pipe to be Laid or Removed by Authority.*

7.—The *authority* may require that the supply-pipe and fittings between the main-pipe of the *authority* and the consumer's premises shall be provided by the *authority*, and laid and maintained or discontinued and removed by the workmen of the *authority* [either at the expense of the consumer or otherwise as prescribed]: Provided that any pipes and fittings supplied, laid, and maintained at the expense of the consumer shall be deemed to be consumer's pipes and fittings respectively, as defined in these bye-laws and regulations.

*Note.*—This bye-law applies where any Special Act gives the *authority* the power to lay the pipes referred to, and the words in brackets should be modified accordingly.

*Consumer's Pipes and Fittings.*

8.—All consumer's pipes and fittings shall be provided and laid at the consumer's cost; and no consumer shall be entitled to a supply of water unless and until such pipes and fittings, and the laying and fixing thereof, are approved by the authorized officer of the *authority*, as complying with these bye-laws and regulations.

*Material of Consumer's Pipes.*

9.—All consumer's pipes shall be of *lead, wrought-iron, cast-iron, steel, brass, or copper*, as may be required by the *authority*, and shall conform in every respect to the specifications given in Schedule C attached to these bye-laws.

*Note.*—The words in italics may be modified to suit the requirements of the authority.

*Consumer's Fittings, Testing, and Stamping.*

10.—All consumer's fittings, of whatever kind, shall conform to the specifications given in Schedule D attached to these bye-laws and regulations, or to such further standards and specifications as may from time to time be adopted by the *authority*, and, whether so specified or not, shall be submitted for approval to their authorized officer before being fixed. All such fittings shall be maintained, repaired, and renewed at the consumer's expense, to the satisfaction of the *authority* or their authorized officer. All consumer's fittings or apparatus used in connection with the water supply [*shall be tested and stamped by the* authority *or*] shall bear the stamp approved by the *authority* as guaranteeing conformity with these bye-laws and regulations.

*Note.*—The words in italics to be omitted if no provision is made for testing and stamping.

*Method of Laying Consumer's Pipes.*

11.—All consumer's pipes and fittings shall be properly and completely protected from frost to the satisfaction of the *authority*, and no consumer's pipe laid through an external wall or in the earth shall be less than 2 ft. 6 in. below the surface, nor shall any consumer's pipe or fittings be laid in any position or manner which would involve risk of injury to the pipe or fittings, or waste or contamination of the water. In every case the consumer shall carry out the reasonable requirements of the *authority* or their authorized officer to this end. The position at which the connection of the supply-pipe to the main of the *authority* shall be made shall be fixed by the *authority*.

*Premises not to be Supplied Through More than One Supply Pipe.*

12.—No dwelling-house or other premises charged or chargeable separately with water rate or rent shall be supplied with the water of the *authority* by more than one supply-pipe connected to the main of the *authority*, except with the consent in writing of the *authority*; and all

## GAS COMPANIES' STOCK AND SHARE LIST.

**Referred to on p. 300.**

| Issue | Share. | When ex-Dividend. | Dividend or Dividend & Bonus | NAME. | Closing Prices. | Rise or Fall in Wk. | Yield upon Investment. | Issue. | Share. | When ex-Dividend. | Dividend or Dividend & Bonus. | NAME. | Closing Prices. | Rise or Fall in Wk. | Yield upon Investment. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| £ | | | p.c. | | | | £ s. d. | £ | | | p.c. | | | | £ s. d. |
| 590,000 | 10 | Oct. 15 | 10 | Alliance & Dublin 10 p.c. | 18½—19 | .. | 5 5 3 | 561,000 | Stk. | Aug. 27 | 10 | Liverpool United A. . | 232—234 | .. | 4 5 6 |
| 268,324 | 10 | ,, | 7 | Do. 7 p.c. | 12¾—13¼ | .. | 5 5 8 | 718,100 | ,, | ,, | | Do. B . . | 172—174 | .. | 4 0 6 |
| 310,000 | Stk. | Jan. 14 | 4 | Do. 4 p.c. Deb. | 98—100 | .. | 4 0 0 | 306,083 | ,, | Dec. 30 | 4 | Do. Deb. Stk. | 105—107 | .. | 3 14 9 |
| 200,000 | 5 | Oct. 29 | 6½ | Bombay, Ltd.. . . . | 5⅝—5⅞ | .. | 5 10 8 | 75,000 | 5 | Dec. 11 | 6 | Ma ta & Medn, Ltd . | 4⅜—4⅝ | .. | 6 3 1 |
| 40,000 | 5 | ,, | 6½ | Do. New, £4 paid . | 3½—4⅜ | .. | 6 6 1 | 560,000 | 100 | Oct. 1 | 5 | Met of 5 p.c. Deb. | 100—102 | .. | 4 18 0 |
| 50,000 | 10 | Aug. 27 | 14 | Bourne- 10 p.c. . . | 29—30 | .. | 4 13 4 | 250,000 | 100 | ,, | 4½ | Melbourne 4½ p.c. Deb. | 100—102 | .. | 4 8 3 |
| 51,810 | 10 | ,, | 7 | mouth Gas B 7 p.c. . | 16¼—17 | .. | 4 2 4 | 541,920 | 20 | Nov. 13 | 5⅜ | Monte Video, Ltd. . . | 11⅛—12 | .. | 5 16 8 |
| 53,200 | 10 | ,, | 6 | and Water Pref. 6 p.c. | 15½—16½ | .. | 3 13 10 | 1,775,892 | Stk. | July 30 | 4/12/6 | Newc'tle & G't-sh'd Con. | 110—111 | +½ | 4 3 4 |
| 380,000 | Stk. | Aug. 13 | 12½ | Brentford Consolidated | 247—250 | .. | 5 0 0 | 418,460 | Stk | Dec. 30 | 3⅜ | Do. 3⅜ p.c. Deb. | 91—93 | +⅛ | 3 15 3 |
| 400,000 | ,, | ,, | 5⅜ | Do. New . . . | 187—190 | .. | 5 0 0 | 15,000 | 10 | Aug. 27 | 10 | North Middlesex 10 p.c. | 20—20½ | .. | 4 17 6 |
| 50,000 | ,, | ,, | 5 | Do. 5 p.c. Pref. . | 122—124 | .. | 4 0 8 | 55,940 | 10 | ,, | 7 | Do. 7 p.c. | 13⅜—14 | .. | 5 0 0 |
| 206,250 | ,, | Dec. 11 | 4 | Do. 4 p.c. Deb. . | 101—103 | +1 | 3 17 8 | 300,000 | Stk. | Nov. 27 | 8 | Oriental, Ltd. . . . | 140—142 | .. | 5 12 8 |
| 220,000 | Stk. | Sep. 11 | 10⅜ | Brighton & Hove Orig. | 214—217 | .. | 4 19 1 | 60,000 | 5 | Sept. 30 | 8 | Ottoman, Ltd. . . . | 6¼—6⅜ | .. | 6 5 6 |
| 246,320 | ,, | ,, | 7⅜ | Do. A Ord. Stk. . | 153—156 | .. | 4 19 4 | 31,820 | 53 | Aug. 27 | 13 | Portsea Island A. . . | 138—140 | .. | 4 18 6 |
| 469,000 | 20 | Oct. 15 | 10 | British . . . . . | 42½—43½ | .. | 4 11 11 | 60,000 | 50 | ,, | 13 | Do. B. . . | 132—134 | .. | 4 17 0 |
| 109,000 | Stk. | Aug. 27 | 6 | Bromley, Ord. 5 p.c. . | 114—116 | .. | 5 3 5 | 100,000 | 50 | ,, | 12 | Do. C. . . | 122—124 | .. | 4 16 9 |
| 165,700 | ,, | ,, | 4½ | Do. do. 3½ p.c. . | 84—86 | .. | 5 4 8 | 114,800 | 50 | ,, | 10 | Do. D and E. | 104—106 | .. | 4 14 4 |
| 500,000 | 10 | Oct. 15 | 7 | Buenos Ayres (New) Ltd. | 12—12½ | +¼ | 5 12 0 | 398,490 | 5 | Oct. 29 | 7 | Primitiva Ord. . . . | 6—6⅛ | .. | 5 14 3 |
| 250,000 | Stk. | Dec. 11 | 4 | Do. 4 p.c. Deb. . | 93—95 | .. | 4 4 3 | 796,980 | 5 | Jan. 28 | 5 | Do. 5 p.c. Pref. . | 5—5¼* | .. | 4 15 3 |
| 150.000 | 20 | July 15 | 7½ | Cagliari. Ltd. . . . | 25⅜—26⅛ | .. | 5 9 5 | 488,902 | 100 | Dec. 1 | 4 | Do. 4 p.c. Deb. . | 95—97 | .. | 4 2 6 |
| 100,000 | 10 | — | — | Cape Town & Dis., Ltd. | 4⅜—5⅛ | .. | — | 1,000,000 | 10 | Oct. 15 | 8 | River Plate Ord. . . | 13⅜—14 | .. | 5 14 4 |
| 100,000 | 10 | Apl. 26 | 4½ | Do. 4½ p.c. Pref. . | 4⅜—5⅛ | .. | 8 3 8 | 312,650 | Stk. | Dec. 30 | 4 | Do. 4 p.c. Deb. . | 93—95 | .. | 4 4 3 |
| 50,000 | 50 | Nov. 3 | 6 | Do. 6 p.c. 1st Mort. | 47—49 | .. | 6 2 5 | 250,000 | 10 | Sept. 30 | 8 | San Paulo, Ltd. . . . | 14—14¼ | .. | 5 12 3 |
| 100,000 | Stk. | Dec. 30 | 4½ | Do. 4½ p.c. Deb. Stk. | 76—78 | .. | 5 15 5 | 125,000 | 50 | Jan. 2 | 5 | Do. 5 p.c. Deb. . | 49—50 | .. | 5 0 0 |
| 157 150 | Stk. | Aug. 13 | 5 | Chester 5 p.c. Ord. . . | 111½—113½ | .. | 4 8 1 | 135,000 | Stk. | Sept. 11 | 10 | Sheffield A . . . . | 240—242 | .. | 4 2 8 |
| 1,493,280 | Stk. | Aug. 27 | 5⅛ | Commercial 4 p.c. Stk. . | 107—109 | +1 | 4 15 5 | 269,984 | ,, | ,, | 10 | Do. B . . . . | 240—242 | .. | 4 2 8 |
| 560,000 | ,, | ,, | 5 | Do. 3½ p.c. do. . | 103—105 | .. | 4 15 3 | 523,500 | ,, | ,, | 10 | Do. C . . . . | 238—240 | .. | 4 3 4 |
| 475,000 | ,, | Dec. 11 | 3 | Do. 3 p.c. Deb. Stk. | 81—83 | .. | 3 12 3 | 70,000 | 10 | Oct. 29 | 10 | South African . . . . | 13⅜—14 | .. | 7 2 10 |
| 800,000 | Stk. | ,, | 6½ | Continental Union, Ltd. | 101—103 | .. | 6 6 3 | 6,429,895 | Stk. | Aug. 13 | 5/6/8 | South Met., 4 p.c. Ord. | 121—123 | .. | 4 6 8 |
| 200,000 | ,, | ,, | 7 | Do. 7 p.c. Pref. | 137—140 | .. | 5 0 0 | 1,895,445 | ,, | Jan. 14 | 3 | Do. 3 p.c. Deb. | 84—85 | .. | 3 10 7 |
| 462,170 | Stk. | — | 5 | Derby Con. Stk. . . . | 122—124 | .. | 4 0 8 | 209,823 | Stk. | Aug. 31 | 8 | South Shields Con. Stk. | 153—155 | .. | 5 3 3 |
| 55,000 | ,, | — | 4 | Do. Deb. Stk. . . . | 103—105 | .. | 3 16 2 | 605,000 | Stk. | Aug. 13 | 5/6/8 | S'th Suburb'n Ord. 5 p.c. | 119—121 | +1 | 4 8 1 |
| 148,995 | ,, | Sep. 30 | 5 | East Hull 5 p.c. Ord. . | 98—100 | .. | 5 0 0 | 60,000 | ,, | ,, | 5 | Do. 5 p.c. Pref. . | 121—123 | .. | 4 1 4 |
| 486,090 | 10 | Jan. 28 | 12 | European, Ltd. . . . | 23¾—24* | .. | 5 0 0 | 117,058 | ,, | Jan. 14 | 5 | Do. 5 p.c. Deb. Stk. | 122—124 | .. | 4 0 8 |
| 354,060 | 10 | ,, | 12 | Do. £7 10s. paid. | 17¾—18* | .. | 5 0 0 | 502,310 | Stk. | Nov. 13 | 5 | Southampton Ord. . . | 107—109 | .. | 4 11 9 |
| 15,161,545 | Stk. | Aug. 13 | 4/10/8 | Gas 4 p.c. Ord. . . | 102½—103⅜ | —⅛ | 4 7 6 | 120,000 | Stk. | Aug. 13 | 6⅜ | Tottenham A 5 p.c. . | 134—136 | .. | 4 19 3 |
| 2,630,000 | ,, | ,, | 3⅜ | light 3⅜ p.c. max. . . | 89½—90⅜ | .. | 3 17 4 | 398,940 | ,, | ,, | 5⅜ | and B 3⅜ p.c. . | 106—108 | .. | 4 17 3 |
| 3,799,735 | ,, | ,, | 4 | and 4 p.c. Con. Pref. | 106⅜—107⅛ | .. | 3 14 5 | 149,470 | ,, | Dec. 30 | 4 | Edmonton 4 p.c. Deb. | 100—102 | .. | 3 18 5 |
| 4,193,975 | ,, | Dec. 11 | 3 | Coke 3 p.c. Con. Deb. | 84⅜—85⅛ | .. | 3 10 2 | 182,380 | 10 | ,, | 8 | Tuscan, Ltd. . . . . | 8⅞—9¼ | .. | 8 13 0 |
| 258,740 | Stk. | Sep. 11 | 4⅜ | Hastings & St. L. 3½ p.c. | 95—97 | .. | 4 17 11 | 149,900 | 10 | Jan. | 5 | Do. 5 p.c. Deb. Red. | 98—100 | .. | 5 0 0 |
| 82,500 | ,, | ,, | 6¾ | Do. do. 5 p.c. | 113—115 | .. | 5 8 8 | 193,742 | Stk. | Aug. 27 | 5 | Tynemouth, 5 p.c. max. | 106—108 | .. | 4 12 7 |
| 70,000 | 10 | Oct. 15 | 11 | Hongkong & China, Ltd. | 18—18⅛ | .. | 5 18 11 | | | | | Wandsworth B 3⅜ p.c. . . | 128—130 | .. | 5 0 0 |
| 123,5°0 | Stk. | Sep. 11 | 6⅛ | Ilford "A" and "C" . | 132—134 | .. | 4 17 0 | 255,636 | Stk. | Aug. 27 | 6½ | and 3 p.c. Deb. Stk. | 72—74 | .. | 4 1 1 |
| 65,783 | ,, | ,, | 5 | Do. "B" . . . . | 104—106 | .. | 4 14 4 | 79,416 | ,, | Dec. 30 | 3 | Putney | | | |
| 51,000 | ,, | Dec. 30 | 4 | Do. 4 p.c. Deb. . . . | 102—104 | .. | 3 16 11 | | | | | West Ham 5 p.c. Ord. . | 114—116 | .. | 4 8 4 |
| 4,940,000 | Stk. | Nov. 13 | 8 | Imperial Continental . | 179—181 | .. | 4 8 5 | 895,872 | ,, | Aug. 27 | 5⅜ | Do. 5 p.c. Pref. . | 124—126 | .. | 3 19 4 |
| 473,600 | Stk. | Aug. 13 | 3⅜ | Do. 3½ p.c. Deb. Red. | 95—97 | .. | 3 12 2 | 210,000 | ,, | ,, | 5 | Do. 4 p.c. Deb. Stk.. | 105—107 | .. | 3 14 9 |
| 195,242 | Stk. | Aug. 27 | 6 | Lea Bridge Ord. 5 p.c. . | 120—122 | .. | 4 18 4 | 253,300 | ,, | Dec. 30 | 4 | | | | |

Prices marked * are "Ex div."

consumer's fittings in or on such dwelling-house or premises or used in connection therewith shall be connected to the supply-pipe.

*Separate Supply-Pipe to every Dwelling-House.*

13.—No supply-pipe shall be used to supply water to more than one dwelling-house or other premises charged or chargeable separately with water rate or rent, except with the consent in writing of the *authority*. In the event of any such consent being granted, the supply shall remain subject to the provisions of section 69 of the Water-Works Clauses Act, 1847.

*Position of Stopcock.*

14.—An approved screw-down stopcock, provided by the consumer, shall be placed in such an accessible position as may be approved by the authorized officer, and, if underground, shall be protected by a proper guard-box (or surface box) of approved design. *Subject to the authority undertaking to provide and maintain the same, a second stopcock and guard-box shall be placed in a position to be selected by the authority. The authority shall have exclusive control of this last-named stopcock, and to this end may require that it be fitted with a crutch or spindle head of special design to suit a key kept by the authority.*

*Note.*—The words in italics may be modified or omitted according as the *authority* has power to require that a second stopcock shall be placed at the consumer's expense, or does not desire the second stopcock.

*Taps for Drinking Water.*

15.—In all cases where a constant supply of water is provided by the *authority*, taps available for drawing water for drinking or cooking purposes shall, as far as possible, be supplied from the supply-pipe, and not from any cistern.

*Consumer's Outside Taps or Stand-Pipes.*

16.—No consumer's tap or stand-pipe shall be fixed in any court-yard, public thoroughfare, common staircase, passage, or outside any premises without special permission in writing from the *authority*. No such tap or stand-pipe shall be used for drawing water, unless and until it has been approved by the authorized officer. If, in the judgment of the authorized officer, any such tap or stand-pipe shall, either directly or indirectly, conduce to or be so used or dealt with as to cause waste or misuse of the water of the *authority*, such tap or stand-pipe shall be removed by the consumer within fourteen days of the receipt by him of a requisition to that effect, signed by the authorized officer.

*Prohibited Connections of Consumer's Pipes.*

17.—No consumer's pipe shall be connected to any cistern, tank, water-butt, or other receptacle used for the storage of rain water, or water other than from the mains of the *authority*; and no supply-pipe shall be connected to any water-closet, urinal, steam-boiler, or any closed vessel otherwise than through the supply cistern thereof, or, unless the consent in writing of the *authority* has been first obtained, to any hot-water system, or any apparatus used for heating or trade purposes.

*Certain Supplies to be Passed through Meter.*

18.—Except with the special consent in writing of the *authority*, no water supplied by the *authority* shall be used for other than domestic purposes, as defined in the Water-Works Clauses Act, 1863, or for operating lifts or hydraulic engines or for private stables not rated with the dwelling-house; nor shall such water be drawn from any hose, movable pipe, private hydrant, or automatic sprinkler, unless such water be passed through a meter in accordance with bye-law No. 19.

*Note.*—This regulation must be modified in cases where any Special Act requires the *authority* to supply water without meter for other than domestic purposes.

*Agreement for Meter Supplies.*

19.—In all cases where the water of the *authority* is to be supplied through a meter, the consumer shall sign an agreement in the form prescribed in Schedule B, attached to these bye-laws and regulations, or as otherwise required by the *authority*, and no such supply shall be taken from the mains of the *authority* unless and until such agreement has been signed and the provisions therein contained have been carried out to the satisfaction of the authorized officer.

*Cattle Troughs.*

20.—Watering-troughs for the use of horses or cattle supplied with the water of the *authority*, wherever fixed, shall be of cast-iron or other material approved by the *authority*, and fitted with a ball-tap as provided in Schedule D attached to these bye-laws and regulations, such ball-tap to be enclosed in a covered box, and with the pipe supplying same properly and completely protected from injury by frost or otherwise, to the satisfaction of the authorized officer.

*List of Authorized Plumbers.*

21.—The authority may from time to time publish a list of "Authorized Plumbers," and may require that all work carried out by or on behalf of themselves or consumers in connection with the supply or use of the water of the *authority* shall be executed by one or other of the plumbers named in such list or their workmen. The *authority* may at any time give special consent to work being carried out by any plumbers named in the authorized list of any other authority.

*Penalties for Infringement of Bye-Laws and Regulations.*

22.—In the event of infringement of any or either of these bye-laws and regulations, and otherwise as prescribed, consumers shall be liable to the conditions and penalties provided in the Water-Works Clauses Acts, 1847 and 1863, and such further conditions and penalties as may be provided in any Special Act of the *authority*

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The first schedule referred to in the foregoing regulations is the form of application for the supply of water for domestic purposes; the second, the form of agreement for the supply of water by meter; the third, the specification of supply and distributing pipes; the fourth, the specification and dimensions of fittings, with illustrations; and the fifth, the form for the authorization of plumbers. In the appendix are given extracts from the various enactments relating to water supply.


# BLAND LIGHT—AT HOME & ABROAD.

**What the ACTUAL USERS say.**

Wadden's Stores, St. John's, Newfoundland, photographed at night by the **Bland Light** only.

By the courtesy of **Mr. A. E. Broadberry** and **Mr. W. H. Rennie,** Engineers of the Tottenham and Edmonton Gas Company and St. John's (Newfoundland) Gas Company, respectively, we are able to quote the following letters addressed to these Companies by users:—

*From Aerators, Limited,*
*Upper Edmonton.*

*The "Bland" Lights, we are glad to be able to assure you, have proved extremely satisfactory, and we should like to have them fitted up in our Managing Director's office, Principals' dining-room, and Works Manager's office.*

*From the Proprietor*
*of Wadden's Stores,*
*St. John's, Newfoundland.*

*Since you installed the "Bland" Inverted Gas Lamps in our Fruit and Confectionery Store in Water Street, we have had a most brilliant and satisfactory light.*

*Our Store is generally acknowledged to be one of the* **best lit** *shops in the City.*

*The cost of the light is moderate, and I consider the "Bland" Lamp superior to and cheaper than electric light.*

**For full Particulars of these celebrated Inverted Gas Burners for CHURCH, FACTORY, SHOP, CLUB, or DOMESTIC LIGHTING, write:**

**THE BLAND LIGHT SYNDICATE, LTD.** 63, Queen Victoria Street, London, E.C.; or 20, Fennel Street, Off Corporation Street, Manchester.

## NOTES FROM SCOTLAND.

**From Our Own Correspondent.**

*Saturday.*

At the monthly meeting of the Edinburgh and Leith Gas Commissioners on Monday—Provost Smith, of Leith, in the chair—the Finance and Law Committee reported that, having considered the application for a contribution towards the memorial to the late Sir George Livesey, the Committee resolved that it was *ultra vires*, and that it accordingly could not be granted. The report by the Committee who had charge of the recently-acquired Provisional Order (which appeared in the "JOURNAL" two weeks ago) was adopted without comment. The same Committee reported that the Managers of the Royal Infirmary of Edinburgh had written inquiring if the Commissioners were satisfied that the Scottish Office were entitled to disallow the power asked in the Order to grant special discounts to the Infirmary, a clause to which effect was struck out of the Order by the Scottish Office; and that the Committee had replied that the Commissioners were satisfied that the Scottish Office had the power. The Sub-Committee on the disposal of the old properties of the Commissioners reported that they had considered an offer to purchase a portion of the Portobello works, and had resolved to decline it. They had also instructed the Engineer to prepare a plan of how he proposed the ground might be disposed of for feuing or building; also that they had had an offer to purchase part of the old Leith Gas-Works, and declined it. The Committee further recommended that the Commissioners should not expend any money on the subjects, or enter into a lease of any long duration, and that if the party would undertake to offer £14,000 at an auction sale, the subjects would be re-exposed at this price. This action was approved by the Commissioners.

The Chairman said the Works Committee had had a meeting that day, more particularly with reference to stair lighting. Bailie Bryson, the Convener, said that the Commissioners proposed to ask the Town Council of Edinburgh to allow the Gas Commissioners to put in incandescent stair lights in some of the districts, to the number of 150, to try the effect they would have, and if they found, after experiment, that the lamps were going to be a benefit to the city, they would agree to light the whole of the stair lights with these incandescent burners, in lamps specially designed and made for the purpose. So many of the lamps were also to be offered to the Town Council of Leith, for the same purpose.

It was reported next day that at a meeting of the Treasurer's Committee of the Leith Town Council Mr. Herring's report was submitted. In it it was pointed out that the output of coke by the Commissioners was about 60,000 tons annually, and that some 30,000 tons were exported. In exporting, the Commissioners were in competition with other towns; and when they found that the price of coke from Glasgow and Dundee was 6s. 4d. and 8s. 2d., while the price obtained for the Commissioners' coke was 10s. 5d., this was sufficient evidence as to the quality they produced. Mr. Herring denied that there was any difference in the quality of coke supplied to various classes of consumers. Differences in the coke were entirely due to differences in the coal. The Committee agreed to allow the report to lie on the table.

The supply of gas to Crossgates, which I mentioned last week, formed the subject of consideration at a meeting of the ratepayers of that place which was held on Thursday evening. Mr. R. W. Wallace, the County Council representative, presided, and submitted letters from the Corporation of Dunfermline and the Cowdenbeath Gas Company, Limited, containing the terms upon which they were prepared respectively to supply gas. The Corporation would bear the cost of all the distributing plant up to the meters, and the villagers would pay the interest and depreciation on all outlays, *plus* 2s. 3d. per 1000 cubic feet for gas. This would amount to about the undernoted prices through ordinary meters, when the total consumption of gas per annum amounted to: 2,893,000 cubic feet, 4s. 6d.; 3,255,000 cubic feet, 4s. 3d.; 3,720,000 cubic feet, 4s.; 4,340,000 cubic feet, 3s. 9d.; and 5,208,000 cubic feet, 3s. 6d. As some security to the Corporation, a condition of the terms was that a public lighting district be formed, and a contract entered into for the lighting of the area for fifteen years; and that the County Council allow the Corporation to lay down and keep in repair all necessary pipes for private and public supply in the roads under their control. The Cowdenbeath Gas Company offered to supply gas exactly the same as in Cowdenbeath—viz., the price of gas would be 4s. 2d. per 1000 cubic feet, with a discount of 2½ per cent. off accounts between £5 and £10, and 5 per cent. off accounts of £10 and upwards, which would bring the price to less than 4s. to the consumers. To prepayment meter consumers, 16 cubic feet of gas would be supplied for a penny, with a discount of 1s. 8d. to all such consumers. The Company would lay all mainpipes throughout the district, and also lay connections and fix meters free of charge. Meter-rents would not be charged; and the proprietors would not require to pay for anything except house fittings and burners. Consumers would pay for nothing except the gas they consumed. Every consumer would be supplied free with a griller, if wanted, and the larger sizes of cookers would be hired at low rentals. The Company would open a show-room and office in the village, and station a qualified man there to attend to the wants of consumers. Experienced gas-fitters would be sent out to clean burners and do small repairs free of charge. The Company were prepared to offer special terms for public lighting should a lighting district be formed; and while they could not guarantee an immediate reduction in the price of gas, it must be understood that their price was likely to be reduced to something under 4s. within a few months' time. The ratepayers unanimously resolved that a gas supply be introduced, and that efforts be made to form a special lighting and scavenging district. A Committee was appointed to make full inquiries into the proposals, and to report to a future meeting of ratepayers.

A petition against the Provisional Order which is being promoted by the Musselburgh Gas Company has been lodged by the Musselburgh and District Electric Light and Traction Company, Limited.

The report of the Directors of the Coatbridge Gas Company states


# Trade Appliances.

The GAS JOURNAL SOME MONTHS AGO SAID:—

"When we consider the multifarious industrial work—on the large scale of manufacture down to the small home scale—in which heat is required, there seems to be great possibilities in this direction **for developing the day side of the gas business.** Industrial uses are practically continuous from Monday morning till noon on Saturday and from January to December. Considering this, there appears to be good scope for enlarging this branch of consumption——. . . ."

**We welcome your Enquiries** for every kind of **Gas Appliance.** Our Works are splendidly equipped for supply of **every** Article needed by various Trades, and we will gladly forward to you Illustrations, Prices, and fullest details.

**RICHMOND GAS STOVE & METER CO., LTD.**

*Advertisement of the RICHMOND GAS STOVE & METER CO., LTD.*
*London Offices and Show-Rooms: 132, Queen Victoria Street, E.C. General Offices and Works: Warrington.*

that the gross revenue for the past six months amounted to £14,920. This is sufficient to pay all the necessary costs of maintenance, and dividends at the rate of 11½ per cent. on the original stock, and of 8 1/10 per cent. on the new stocks. In December last, 200 shares of £10 each were issued to the public, and realized an average price of £17 7s. apiece. A Provisional Order is being sought, to allow of the reduction of the illuminating power of the gas to 15 candles, and to secure a more modern method of testing.

It is proposed to hold an electrical exhibition in Aberdeen in the course of the spring. The subject was before a Sub-Committee of the Electricity Committee of the Town Council on Wednesday. Traders in electrical apparatus were present, on the invitation of the Sub-Committee, and their attitude towards the proposal was that they saw no good that the exhibition was likely to do so long as the price of electricity remains so high in Aberdeen as it is at present. They consider that, until there is a substantial reduction in price, electricity cannot compete with gas, either for heating or power purposes. The contractors left the meeting after having given a clear indication that they can give no assistance to the Town Council in promoting the exhibition. In addition, the traders gave expression to their views on what they consider is unfair municipal trading in regard to the system carried on by the Gas Department. Their complaint was that the Department hire out gas-stoves at such a low rate that no private traders can compete with them, and that the workmen of the department fit up the stoves practically free of cost. Almost the same thing, they argued, would result if the Electricity Department proceeded, on similar lines, to fit up electrical apparatus for purposes of cooking or heating.

A writer in the "Falkirk Herald" of to-day, who gives his name—W. J. Rodgerson—advocates the installation of gas-engines for the supply of power for the production of electricity in the burgh. He suggests the installation of plant at the Corporation gas-works, and considers that the Gas Engineer would be able to advise whether the gas he makes could be used at any stage of manufacture at such a price as would compete with either Dowson or Mond gas. He cites a large number of instances in which gas-driven engines are used to produce electricity, and states his belief that such a power station would by-and-bye prove a source of considerable profit to the town.

**Gas-Works Purchase Suggested at Whitchurch.**—The Whitchurch Urban District Council have decided to ask the Directors of the local Gas Company whether they are willing to dispose of their undertaking; and if the reply is in the affirmative, a meeting will be held to discuss terms. The view was expressed that the Company were extremely unlikely to sell at anything below the price at which the concern was offered eight or ten years ago—£35,000. The only dissentient urged that Whitchurch was already well and cheaply lighted, and that it would be risky to purchase the undertaking just when all sorts of improvements were constantly being made in various lighting systems.

## CURRENT SALES OF GAS PRODUCTS.

**Sulphate of Ammonia.** LIVERPOOL, *Jan.* 30.

The market has manifested further weakness as the week has progressed; the month's contracts being covered, and direct orders continuing to be very scarce. Prices have consequently declined further; so that the closing quotations are £11 8s. 9d. per ton f.o.b. Hull, £11 10s. per ton f.o.b. Liverpool, and £11 12s. 6d. to £11 15s. per ton f.o.b. Leith. The large makes being already fully sold for delivery ahead, makers are maintaining a very firm attitude in regard to further business, and no important first-hand transactions have been reported. There is, however, again speculative offering abroad, and sales are reported at but a trifling premium on spot prices.

**Nitrate of Soda.**

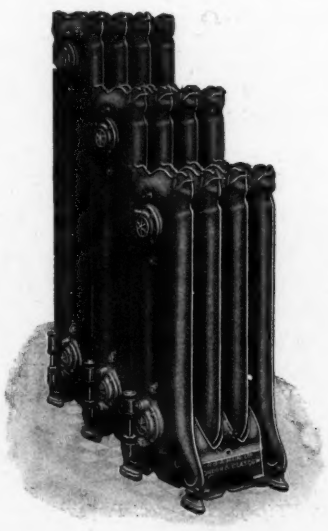
This market is very quiet, and spot prices remain 9s. 6d. per cwt. for 95 per cent., and 9s. 7½d. for refined quality.

**Tar Products.** LONDON, *Feb.* 1.

The market for tar products has been quiet during the past week. Pitch remains in about the same position, and manufacturers are fairly firm in their ideas, evidently being moderately well sold. A certain amount of business has been done at 18s. to 18s. 3d. on the east coast for January-June delivery; while in London it is doubtful whether manufacturers can obtain anything above 18s. 6d. over the same period. Nothing of importance is reported on the east coast, though business is said to have been done in Liverpool at 18s. In Swansea, Scotch pitch is said to have been sold at low figures for January-June delivery. On the Continent, some business has been done for delivery all over the present year at a slightly advanced price on to-day's figures. Creosote is steady, and maintains its value fairly well, though in one or two directions the market appears to be slightly easier. In London, 2¾d. to 2⅞d. is still about the value of the ordinary makes; but for the best qualities manufacturers are asking more than this. In the Midlands, 2¾d. to 2⅞d. is asked. In the North, business is reported at 2½d. to 2⅝d., and some quantity is reported to have been sold f.o.b. export steamer at 3d. Benzol is very weak, and business has been done to the end of September next at 5½d., casks included, f.o.b. in the North. Benzol, 50-90 per cent., is quiet, and there is not very much offering. Toluol is firm, but there is little or no inquiry just at present. Solvent naphtha is steady, and a fair quantity has been sold *ex* works in the North at 8d. naked, for delivery to the end of the year. Carbolic is quiet, and Continental manufacturers report purchases at 1s. for delivery to the end of June next. Crystals are weak, and there are large stocks of this article unsold. Creosote salts are in fair demand at reasonable prices. Anthracene is unchanged. Naphthalene is quiet, and stocks in this article are heavy.

The average values during the week were: Tar, 10s. 9d. to 14s. 9d., *ex*


# THE "ST. MUNGO" RADIATOR



is constructed with

BORED AND FACED JOINTS

and

STEEL PUSH NIPPLES.

All Joints between tubes are absolutely

METAL TO METAL.

No Red Lead used.

**R. & A. MAIN, LTD.,**

49, Queen Victoria Street, LONDON, E.C., and Gothic Works, FALKIRK.

works. Pitch, London, 18s. 3d. to 18s. 6d.; east coast, 18s. to 18s. 3d.; west coast, 17s. to 18s. f.a.s. Mersey ports, 17s. 3d. to 17s. 6d. others. Benzol, 90 per cent., casks included, London, 6d.; North, 5½d.; 50-90 per cent., casks included, London, 6⅞d. to 7¼d.; North, 6½d. to 7d. Toluol, casks included, London, 9d. to 9¼d.; North, 8¾d. to 9d. Crude naphtha, in bulk, London, 3¾d. to 4d.; North, 3½d. to 3⅝d.; solvent naphtha, casks included, London, 10⅜d. to 11d.; North, 9¾d. to 10d.; heavy naphtha, casks included, London, 11d. to 11½d.; North, 10d. to 10¼d. Creosote, in bulk, London, 2¾d. to 2⅞d.; North, 2⅝d. to 2¹¹⁄₁₆d. Heavy oils, in bulk, 3d. to 3³⁄₁₆d. Carbolic acid, 60 per cent., casks included, east coast, 1s.; west coast, 11d. Naphthalene, £3 10s. to £6 10s.; salts, 32s. 6d. to 35s., packages included and f.o.b. Anthracene, "A" quality, 1½d. to 1⅝d. per unit, packages included and delivered.

**Sulphate of Ammonia.**

The market has been quiet throughout the past week, and there has been little or no inquiry for same. Buyers appear to have made arrangements early in the month for their prompt requirements. Tender parcels are reported to have been sold at rather easier prices; but manufacturers are very firm indeed in their ideas, as they are undoubtedly well sold, and there is no necessity, at any rate for the present, for them to reduce their price. The Gas Companies still quote £11 15s. to £11 17s. 6d. for forward delivery; and for London parcels, £11 10s. to £11 12s. 6d. Beckton terms is asked. In Hull, the market is about £11 12s. 6d. to £11 13s. 9d.; and in Liverpool, £11 13s. 9d. to £11 15s. In Leith, manufacturers are still asking £11 17s. 6d.

## COAL TRADE REPORTS.

**Northern Coal Trade.**

There has been a fair amount of activity in the coal trade; but this is a season in which the shipments are usually rather low. Steam coals have shown a slight ease in the prices for prompt delivery; but there are more inquiries for season delivery. For early delivery, the figure quoted for best Northumbrians is about 10s. per ton f.o.b.; but one or two collieries, with fair order books, ask a little higher. Second-class steams are from 9s. to 9s. 6d.; and steam smalls are easy, varying from about 3s. 9d. to 5s. 6d. The gas coal trade has still a strong demand, and the keen weather has added to the consumption. Durham gas coals vary in price from about 9s. to 10s. per ton f.o.b. for the usual qualities; while for "Wear specials," from about 10s. 6d. to 10s. 9d. per ton is the f.o.b. price. As to contracts, that for Magona is believed to be settled, the price at Porto Vecchio being about 16s. per ton for quantities to be delivered before the end of March. More sales are being negotiated for delivery over the shipping season; but buyers look for some concession in the price, while coalowners seem to look for continued values as at present. Coke is steady generally; but gas coke is still abundant, and the price may be regarded as from 12s. 6d. to 13s. per ton f.o.b., though there are some who quote lower figures.

**Scotch Coal Trade.**

The coal market is in an unsettled state, owing to the uncertainty which prevails as to how the demurrage and siding rent charges of the railway companies are to operate. The export trade, so far as buying is concerned, has almost come to a standstill, on account of both buyers and sellers refusing to accept responsibility for claims for detention of waggons at ports, caused by the unavoidable uncertainty of the arrival of vessels. For home consumption there is a very fair demand, for splint especially, and also for small sorts. The prices quoted are: Ell 9s. 6d. to 10s., splint 10s. to 10s. 6d., and steam 9s. 6d. to 10s., per ton f.o.b. Glasgow. The shipments for the week amounted to 247,195 tons—an increase of 49,098 tons upon the preceding week, but a decrease of 6027 tons upon the corresponding week of last year. For the year to date, the total exports have been 655,722 tons—a decrease of 31,225 tons upon the corresponding period.

**Melbourne Metropolitan Gas Company.**—Messrs. John Terry and Co., the London agents for this Company, have been informed by cable that the profits for the half year ending the 31st of December last were £72,750. A dividend of 5s. per share has been declared for this period; a sum of £24,000 has been added to the reserve fund; and a balance of £8500 is carried forward.

**Engineering Assistant Question at Belfast.**—The Belfast Gas Committee, at a recent meeting, again discussed the question of the appointment of a Gas Engineering Assistant; and it was unanimously resolved that the Council be recommended to authorize the Committee to make the appointment at a remuneration not exceeding £250 per annum; Alderman Craig, Councillor Riddell, and the Manager (Mr. R. Sharpe) to select a suitable person for the position.

**Swinton and Mexborough Gas-Works Purchase.**—It was mentioned in the "JOURNAL" for the 19th ult. (p. 194) that a poll was to be taken on the question of the purchase of the gas-works by the Local Authorities of Swinton and Mexborough. This was done on Saturday, with the following result. For the purchase, 1296; against, 388—majority for, 908. The majority was fairly evenly divided between the two places; being 475 in Mexborough and 433 for Swinton.

**Dublin Corporation and the Gas Company's Bill.**—At a special meeting of the Dublin Corporation held last Friday, the Town Clerk read a letter from the Law Agent, on the subject of the Bill of the Alliance and Dublin Consumers' Gas Company, which he said would require "the most careful consideration in the interests of the City." He also read a report on the same subject addressed by the Law Agent to the Lighting Committee, and submitted his own report thereon. He advised the Council to pass the necessary resolutions to enable them to oppose the Bill. After a somewhat heated discussion, a motion to this effect was carried unanimously.


**The Severe Weather**

may be a discouragement to some, but it means *fresh business* to Gas Authorities who list

**Wright's**

**Gas Fires**

The "STADIUM."

**The "Stadium"**

has the

**Patent "Thermo" Firefront.**
**Patent "Duplex" Burner, fitted with "Simplex" Gas and Air Adjusters.**

*The ideal Fire for Hiring-out Purposes.*

**JOHN WRIGHT & CO.,**
**ESSEX WORKS,**
**BIRMINGHAM.**

No. 186.

### Salaries in Manchester Gas and Water Departments.

At the monthly meeting of the Manchester City Council to-morrow (Wednesday), a resolution will be submitted by Councillor Swales to the effect that, in view of the present heavy financial demands on the citizens, no advance in salaries be made at present to those who are in receipt of over 25s. per week. As a matter of fact, the list of proposed advances this year is much smaller than formerly. In the case of the Gas Committee, the following recommendations are made: Mr. J. G. Newbigging, M.Inst.C.E., the Chief Engineer to the Department, from £1100 to £1200; Mr. J. H. Hill, Manager at the Bradford Road works, from £450 to £475, with a maximum fixed at £500 per annum; Mr. G. W. Tooley, Manager at the Rochdale Road station, from £375 to £400 (maximum, £450); Mr. T. Williams, Chief Cashier, from £375 to £400 (maximum, £500); Mr. T. Harrison, Chief Deposits Clerk, from £325 to £340 (maximum, £350); Mr. C. A. Price, Assistant-Cashier, from £265 to £275 (maximum, £300); Mr. H. J. Brocklebank, Statistician, from £250 to £260 (maximum, £300); Mr. J. Gradwell, Collector, from £250 to £260 (maximum, £300); the Water Works Committee recommend that the salary of Mr. M. G. Shaw, the Chief Rate Clerk, be advanced from £290 to £300 per annum.

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**Amman Valley Gas Company, Limited.**—A meeting of shareholders in this Company was held at the Cannon Street Hotel last Friday afternoon; but we learn from a press agency that the proceedings were conducted in private.

**The Sutton Gas Company's Enterprise.**—In the "JOURNAL" last week, it was mentioned that the Sutton Gas Company had opened a new office and show-rooms in the High Street, where residents were afforded an opportunity of inspecting the latest types of appliances for the utilization of gas. In a well-written article in a recent issue, a local paper directed attention to the special features of the various stoves and burners on view, and concluded by congratulating the Company on having taken up so prominent a position in the town. "That their enterprise is appreciated," the writer remarked, "is shown by the large numbers of people who visit the show-rooms," while the convenience of a central office is extremely great. The High Street establishment is not only an ornament to the town by reason of its artistic arrangement and its brilliant lighting, it is an educational force, and has already done much to enlighten the public upon the important question of the place which coal gas holds, and is likely to hold, as an agent for cooking, heating, and lighting."

**Bideford Water Supply.**—A report on the subject of the water supply was presented to the Bideford Town Council on Thursday. A Sub-Committee recommended that an expert should be called in to advise on the various schemes for augmenting the supply; but the Water Committee did not adopt the report, and recommended instead that negotiations should be entered into for the acquisition of a supply from Kingdon Moor. Mr. Fulford, in support of the action of the Committee, contended that it was unnecessary to pay a large fee for the report of an engineer, when the course which should be pursued was obvious. Kingdon Moor and an adjacent stream would yield about 12 or 13 million gallons yearly for the augmentation of the supply in the lower reservoirs. If they found this insufficient, they could go in for the Stalford Lake scheme, which had been suggested. They might, however, carry on for ten years, and by that time they would have paid off a number of existing loans and eased the financial situation of the town. He admitted that he had advised, at the meeting of the Sub-Committee, that an expert should be called in; but he only did so because the Committee could not agree upon any other course that was suggested. His view was that if they went in for the Kingdon Moor scheme now, and found in a few years it was not sufficient, they could adopt some larger proposal. The report was adopted without opposition; and it was decided that the water from Kingdon Moor should be analyzed.

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The Southwark Coroner is credited with the following statement: "There is no such thing as a fire-proof building, and even iron will burn in cases of an electric fusing. Builders have told me that stone will crack up."

A member of the Corporation of Newport, Isle of Wight, was summoned on Monday last week for using water by hose without giving the required notice. The Corporation charge is £1 a year; and though the defendant had offered to pay 10s., he contended that the Corporation were not empowered to levy the extra amount. The Bench ordered the payment of £1, with 11s. 6d. costs.

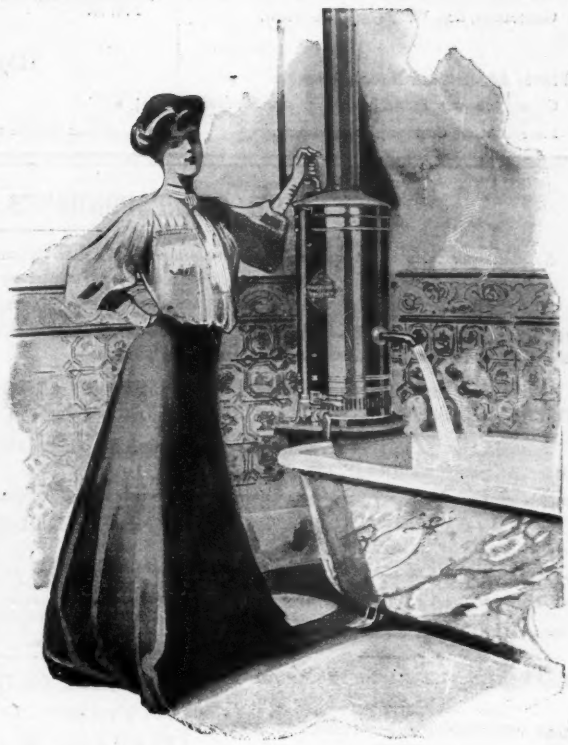
The Directors of the National Gas-Engine Company, in their report for the year ending Dec. 31, state that the net profit, after providing amply for depreciation of buildings, tools, &c., and allowing for management salaries and income-tax, is £44,985. Interim dividends were paid on July 31, leaving £26,816, which, added to the sum brought forward, makes a total of £43,128 to be dealt with. The Directors recommend a final dividend at the rate of 20 per cent. per annum on the ordinary shares for the six months ended Dec. 31; leaving £24,959. Of this they propose to place £10,000 to the reserve fund (making it £90,000), and carry forward £14,959.

The Directors of the Rhymney Iron Company, in an interim report for the half year ended Sept. 26, just issued, make the following observations, from which it will be seen that the passing of the Coal Mines (Eight Hours) Bill is causing uneasiness to iron and steel companies: "Since the annual meeting, the Coal Mines (Eight Hours) Act has been passed, and will come into force, so far as South Wales is concerned, on July 1 next. The operation of this Act must inevitably reduce the output, and substantially increase the cost of working coal. The results for the six months ended Sept. 26 would have justified the declaration, as last year, of an interim dividend; but in view of the present prospects of trade, and the general uncertainty as to the future arising from the passing of the Act above referred to, the Directors deem it prudent to await the final results of the year's operations before making any recommendation as to the payment of a dividend."


# 'WHAT ABOUT THE HOT BATHS?'

This question always arises when a Gas Cooker is installed; and the only satisfactory reply is

**"USE A MAUGHAN'S GEYSER."**



"Maughan's Geysers" are the Product of the 40 years' Experience of the **Original Makers.**

They have an established reputation, and maintain their position as the most economical and satisfactory Water-Heaters.

THE

**PARKINSON STOVE Co., Ld.**

*(Incorporating Maughan's Patent Geyser Co.),*

| BIRMINGHAM: | LONDON: |
|---|---|
| STOUR STREET, SPRING HILL. | 129, HIGH HOLBORN, W.C. |

Under the title of "Coalexld Limited," a private Company has just been registered, with a capital of £30,000, in £1 shares, to adopt an agreement with Messrs. J. Jowett, J. Hodgson, S. R. Ogden, and H. Crellin, and to carry on the business of manufacturers or merchants of fuel or gas. Mr. Jowett is the Managing-Director.

Referring to the recent discovery of a coal seam at Powlett River, the Director of the Government Geological Survey states that the find is the greatest mineral discovery made in Victoria for 25 years, and will ultimately make it independent of the other States in regard to coal. The quantity of coal available in the new field may be computed, according to the same authority, with the greatest safety at from 10 to 20 million tons.

In the course of a lecture on the "Gassing of Yarns," Mr. J. W. Kershaw said that ordinary town gas was generally employed; but to use it as supplied was extremely wasteful, and liable to smoke the yarn. It had long been acknowledged that a brighter yarn was obtained, and more economically, by using a flame from a mixture of air and gas; and bunsen or other burners had been in use. Air passing in from the room to the burner, however, carried dirt which lodged inside, resulting in imperfect mixing, so that the burners along the frame were irregular and gave uneven gassing. High-pressure lighting induced more air and assisted better mixing; and on the principle of high pressure, gas and air mixing was introduced in 1904. This had overcome practically all the disadvantages incidental to the old system.

## WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

### Situations Vacant.

TRAVELLER (COAL). No. 5049.
WORKING FOREMAN (AUSTRALIA). No. 5051.
WORKING MANAGER. Laindon Gas and Water Company.
CLERK. No. 5052.

### Situations, &c., Wanted.

ASSISTANT-MANAGER. E. Sainter, Gas-Works, Longwood.
DIVING (SURVEYING OR CONSTRUCTIONAL). Lambert, Kennington.

### Plant, &c. (Second-Hand), for Sale.

GASHOLDER, &c. Wallingford Gas-Works.

### Plant, &c. (Second-Hand), Wanted.

GASHOLDER AND TANK, PURIFIERS, AND SCRUBBER. No. 5050.
PHOTOMETER. Centenary Gas Company.

### Meetings.

BARNSTAPLE GAS COMPANY. Bridge Hall, Barnstaple. Feb. 20. Twelve o'clock.
BRENTFORD GAS COMPANY. St. Ermin's Hotel. Feb. 12. 2.30 o'clock.
SOUTH SUBURBAN GAS COMPANY. De Keyser's Royal Hotel. Feb. 19. Three o'clock.
TOTTENHAM AND EDMONTON GASLIGHT AND COKE COMPANY. Offices. Feb. 20. Three o'clock.
WEST HAM GAS COMPANY. Liverpool Street Hotel. Feb. 23. Twelve o'clock.

### Stocks and Shares.

ALDERSHOT GAS AND WATER COMPANY. Feb. 23.
HERTS AND ESSEX WATER COMPANY. Feb. 23.
SOUTH-WEST SUBURBAN WATER COMPANY. Feb. 23.
SUNDERLAND AND SOUTH SHIELDS WATER COMPANY. Feb. 18.

### TENDERS FOR

### Coal.

NELSON GAS DEPARTMENT. Tenders by Feb. 16.

### Fire-Clay Goods.

HATHERSAGE AND DISTRICT GAS COMPANY. Tenders by Feb. 23.
MOSSLEY GAS DEPARTMENT. Tenders by Feb. 8.

### General Stores (Purifying Riddles, Lime, Ironmongery, Brass Fittings).

MOSSLEY GAS DEPARTMENT. Tenders by Feb. 18.
NELSON GAS DEPARTMENT. Tenders by Feb. 16.
SALFORD GAS DEPARTMENT. Tenders by Feb. 11.
STOCKTON-ON-TEES CORPORATION. Tenders by Feb. 15.

### Governor.

MOSSLEY GAS DEPARTMENT. Tenders by Feb. 18.

### Retort Settings, Ironwork, &c.

HATHERSAGE AND DISTRICT GAS COMPANY. Tenders by Feb. 23.
MOSSLEY GAS DEPARTMENT. Tenders by Feb. 18.

### Sulphuric Acid.

NELSON GAS DEPARTMENT. Tenders by Feb. 16.

## NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

*No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.*

**COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.**

**Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.**

**Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.**

**TERMS OF SUBSCRIPTION to the "JOURNAL."**
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Payable in advance. If credit is taken, the charge is 25s. a year.
**Abroad (in the Postal Union): £1 7s. 6d., payable in advance.**

All Communications, Remittances, &c., to be addressed to WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.
**Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.**


**OXIDE OF IRON.**

**O'NEILL'S OXIDE**
For GAS PURIFICATION.
LARGEST SALE OF ANY OXIDE.

**SPENT OXIDE PURCHASED IN ANY DISTRICT.**

GAS PURIFICATION & CHEMICAL CO., LD.,
PALMERSTON HOUSE,
OLD BROAD STREET, LONDON, E.C.

**WINKELMANN'S**
**"VOLCANIC" FIRE CEMENT.**
Resists 4500° Fahr. Best for GAS-WORKS.
ANDREW STEPHENSON, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

**BROTHERTON & CO., LIMITED.**
Offices: City Chambers, LEEDS.
Correspondence invited.

**"HALLITE" Asbestos High-Pressure Sheeting.**
HALLITE DOUGLAS, LIMITED, 106, Leadenhall Street, LONDON, E.C.

**LUX'S GAS PURIFYING MASS.**
See Advertisement on p. 279.
FRIEDRICH LUX, LUDWIGSHAFEN-AM-RHEIN.

**GAS PLANT for Sale—We can always** offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
FIRTH BLAKELEY, SONS, AND COMPANY, LIMITED, Thornhill, DEWSBURY.

**J. & J. BRADDOCK (Branch of Meters** Limited), Globe Meter Works, OLDHAM, and 54 & 47, Westminster Bridge Road, LONDON, S.E.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS, AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 815 Oldham, and 2412 Hop, London.
Telegrams:—
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**OXIDE OF IRON (BOG ORE).**
ANY QUANTITY. ANY PORT. ANY STATION.
**DONALD M'INTOSH,**
110, CANNON STREET, LONDON.

**DUTCH OXIDE OF IRON.**
**SPENT OXIDE PURCHASED IN ANY DISTRICT.**

**THE First Dutch Bogore Co., Ltd.,**
NYMEGEN, HOLLAND.
*General Manager (for England and Wales)*—
CHARLES E. FRY, LEAMINGTON,
*General Manager (for Scotland)*—
J. B. MACDERMOTT, 11, Bothwell St., GLASGOW.

**KRAMERS AND AARTS WATER-GAS PLANT.**
K. & A. WATER-GAS COMPANY, LTD.,
89, VICTORIA STREET, S.W.

**JOHN RILEY & SONS, Chemical Manu**facturers, Hapton, near Accrington, are MAKERS of Special SULPHURIC ACID, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 50 YEARS. References given to Gas Companies.

**OXIDE OF IRON.**
(NATURAL.)
SPENT OXIDE PURCHASED.
**BALE'S FIRE CEMENT.**
**PAINT FOR GAS-WORKS.**
**BALE & CHURCH,**
5, CROOKED LANE, LONDON, E.C.

**SULPHURIC ACID.**
**SPECIALLY prepared for the Manu**facture of SULPHATE OF AMMONIA.
SPENCER CHAPMAN & MESSEL, LTD., with which is amalgamated WM. PEARCE & SONS, LTD., 86, Mark Lane, LONDON, E.C. Works: SILVERTOWN.
Telegrams: "HYDROCHLORIC, LONDON."
Telephone: 341 AVENUE.

APPLY TO THE
**CHAIN BELT ENGINEERING CO.,**
DERBY, ENGLAND,
FOR REALLY HIGH-CLASS
ELEVATORS AND CONVEYORS,
ALSO
DRIVING AND CONVEYOR CHAINS.

**SULPHATE OF AMMONIA** SATURATORS and all LEAD and TIMBER WORK in Connection with Sulphate Plants.
We guarantee promptness, with efficiency for Repairs.
JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON.
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